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ESSAYS,

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BY

JOHN BRETT, ESQ.

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PHYSICAL PARADOXES.

I. THE Greek word Paradox, or Paradoxologia, does not properly ſignify a falſe or implicatory propoſition, but an improbable or incredible one; and therefore, this word is commonly applied to thoſe propoſitions, which in the eye of the generality of mankind, at firſt ſight ſeem falſe and contradictory, and difficult to be aſſented to; but upon examining them ſtrictly and with attention, appear to be either true or probable. In this diſcourſe, we ſhall treat of ſome of the things of this ſpecies, which are to be found in the line of natural philoſophy.

PARADOX I.

Elemental Fire is not hot in the higheſt Degree.

SECT. I.

II. Vulgar phyſics, diſtribute the four qualities which are called firſt, among the four elements, aſſigning to each element one of them

 that

that is intenſe in the higheſt degree, and another which approaches, or comes near to the higheſt. Thus to fire they attribute heat in the higheſt degree, and dryneſs which is nearly approaching to the higheſt. To the air, humidity in the higheſt degree, and heat near to it. To the water, coldneſs in the higheſt degree, and moiſture near to it. To the earth, dryneſs in the higheſt degree, and coldneſs near to it. This diſtribution, which if regulated, not by a nice examination of the nature of things, but only by an imaginary proportion, is expoſed to three ſerious and weighty objections which are ſtarted againſt it by the modern philoſophers; and it is only to the propoſition that fire is hot in the higheſt degree, that they have hitherto made no difficulty of aſſenting; but that is the point I at preſent mean to controvert.

III. That elemental fire is not hot in the higheſt degree, may be evinced, by ſhewing there is another heat which is much greater, and that is the heat of the ſun, when its rays are concentrated in a burning-glaſs. It is certain, that the moſt vigorous effects and operations of elemental fire, does not come up in any degree of compariſon, to thoſe of that moſt ardent ſtar. This has been proved evidently, by the experiments made with the burning-glaſs invented

invented and fabricated by Monſ. Villete, an eminent artiſt of Lions in France; a deſcription of which, was printed and publiſhed at Liege in 1715, and was afterwards inſerted in the Memoirs of Trevoux of the year 1716. The inſtant the focus of this burning-glaſs was applied to any ſort of wood, be it ever ſo green or moiſt, it ſet it as ſuddenly in a flame, as elemental fire would do dry tow. In leſs than a minute, it melted metals which were the moſt difficult of liquefaction, ſuch as copper, iron, gold, and all minerals in general. The higheſt operation the chymiſts have found elemental fire capable of performing, is that of vitrifaction, which is ſo called from its reducing matter to a ſpecies of glaſs; but the moſt intenſe fire, beſides its being tardy in this operation, can perform it only on particular ſubjects; whereas the burning-glaſs vitrifies in a ſhort time, every kind of matter, tiles, bricks, cement, bones, ſtones of all ſorts, even marble, and porphyry; and what is moſt extraordinary, it vitrifies thoſe ſort of ſtones alſo, with which they make the bottoms of furnaces for melting iron ore in, which although they will endure that intenſe heat for many years together, will begin to diſſolve almoſt immediately, upon applying the focus of the burning-glaſs to them.

IV. Although this is very wonderful, what we are about to relate is ſtill more ſo. The analytic reſolution of gold, or what is the ſame thing, the ſeparation or diviſion of its principal component parts, had till then been deemed impoſſible; for the miſers are not more tenacious of hoarding or preſerving their gold, than the gold is of preſerving its intrinſic texture; for in ſpite of all the tortures by fire, which the chymiſts could invent to break this texture, they could never make it loſe its original form. Yet notwithſtanding the valour of this generous metal, it ſubmitted obediently to the power of the ſun exerted through the burning-glaſs; as if that power to whom it is ſaid to owe its exiſtence, was the only one to which it could bear to be ſubject.

V. Monſ. Homberg, of the Academy Royal of Sciences, was the firſt who experienced this rare phenomenon, by reſolving into ſmoak, with the focus of the burning-glaſs, at the Palace Royal at Paris, a great portion of its maſs, which this celebrated chymiſt judged to be the mercurial part of the gold, and when this was gone, the reſidue which remained, appeared to be a terreſtrial matter, mixed with ſomewhat of ſulphur, that afterwards vitrified. So that in the opinion

nion of Monſ. Homberg, ſulphur, and mercury, together with a portion of earth, is what gold is compoſed of, and although the two firſt are by their nature volatile, and capable of being diſſipated and divided by the power of fire in all other metals, and in all other mixtures, they in gold are ſo intimately united, that no other force or influence can ſeparate them, but that of the ſun; it follows then, that the heat of the ſun is much greater than that of elemental fire, and that this laſt cannot be hot in the higheſt degree, which is what we undertook to prove.

PARADOX II.

The Air ought rather to be eſteemed cold, than hot.

SECT. II.

VI. The quality which Ariſtotle attributes to the air, is cold ſomewhat under the higheſt degree, or nearly approaching to the higheſt degree. Other philoſophers, with more foundation of reaſon, eſteem it indifferent to heat and cold; and I, without ſetting about to combat this ſecond opinion, ſay it is more reaſonable to ſuppoſe it cold than hot. Which I ſhall attempt to demonſtrate in the following manner: in or-

der to make a judgement of the qualities appertaining to a particular thing, we ſhould conſider it in a ſtate, where it is diveſted of the influence of any extrinſic agent, by the operations of which it may be affected; the air then ſo circumſtanced, will always be found to be cold; and from thence it ſhould be inferred, that it naturally is cold. The minor of this propoſition is proved, by the air being only warm while it is affected by the rays of the ſun, and by its being found, that whenever that influence is withdrawn, it becomes cold again, and that it is by ſo much the more cold, in proportion to the abſence of that influence. From whence it is obſervable, that in the temperate zones, the air is coldeſt when the nights are long; and that in the ſub-polar, and circum-polar ones, it is extremely cold, on account of the influence of the ſun being withdrawn from them for the ſpace of ſix months together; and that when it returns to enlighten them, becauſe of the obliquity of its rays, it ſtill continues cold, far beyond the degree of mediocrity.

VII. Nor is ſaying that in the abſence of the ſun, the earth is the agent that cools the air any reply to this; for if this was ſo, the lower region of the air would be colder than the middle one, as being nearer to the infrigidating cauſe; but this

this is contradicted by our experience; for we very commonly see, that the water does not freeze in the lower region, when in the middle one it is frozen into hail in the clouds; and very often also, that which was frozen above, thaws suddenly upon its falling down.

VIII. If it should be objected to this, that Aristotle and the Peripatetics, when they say the air is warm, speak of the elemental air, and not of the air of the atmosphere which is mixed with an infinite number of heterogenous corpuscles, by some of which it may be made cold, and especially by the many nitrous ones with which it is impregnated. To this I answer first, that in the country where I am now writing, there is not the least appearance of the air being nitrous, for that there is not a grain of nitre to be found in the whole country, notwithstanding which, the cold in winter is sometimes pretty sharp. I answer secondly, that we can only talk of the pure elemental air by conjecture, for no mortal has yet ever breathed any of it, nor is it possible that any one ever should, on account of this element being an open expanse, exposed to the inroads of the effluvias of all other bodies; and we should reason upon sensible qualities, by pursuing the thread of palpable experiments; and not by pursuing that of

ideal proportions, as Ariſtotle did in making the diviſion of his elemental qualities; for the Author of nature is not confined to purſuing only ſuch proportions as fall within the compaſs of our comprehenſion. This is the falſe principle, upon which all the Pythagorean and Ariſtotelic philoſophy has proceeded, and with reſpect to the doctrine of the four elements, that ſeems to be tainted with the ſame vice, as I ſhall ſhew more fully in another place. All that I ſhall ſay at preſent is, that Ariſtotle dealt out, and diſtributed the four qualities among the four elements, as if he had been the abſolute maſter of them all, and could diſpoſe of and arrange them agreeable to his will and pleaſure.

PARADOX III.

Water conſidered according to its Nature, is rather diſpoſed to be ſolid, than fluid.

SECT. III.

IX. This may be demonſtrated, upon the ſame principle the antecedent paradox was; remove for any length of time, the interpoſition of any extrinſic agent that may contribute to warm the water, and it will always be found to be ſolid, that is, in a frozen ſtate. This then being ſo, we may

may conclude, that is the ſtate it is diſpoſed to continue in agreeable to its nature. This is evinced by the ſea under the Poles, and in the adjacent parts, being, during the whole ſix months the ſun is abſent from them, frozen to ſuch a degree, that after the ſun has reviſited them, and continued its influence for the other ſix months, it is never totally thawed; and it is for this reaſon, that it has always been found impracticable to ſail to China by that rout.

X. The water being under this influence, is a proof *ad hominem*, that it cannot, agreeable to the doctrine of Ariſtotle, be cold in the higheſt degree, for if that was the caſe it muſt ever continue in a frozen ſtate; ſo that we can only ſay, that by its nature it is moſt diſpoſed to ſolidity.

XI. Frozen water being eaſily made liquid by a moderate heat, is no proof that it is not naturally inclined to ſolidity. Metals may be liquified by an intenſe heat, but that does not ſhew that they are not of a ſolid nature; and a thing being more eaſily, or with more difficulty diſſolved, makes no difference with reſpect to this mode of reaſoning; and therefore the water being made liquid with a leſs intenſe

heat, than is found neceſſary to liquify metals, does not prove, that it is not diſpoſed in its nature to be ſolid as well as them.

PARADOX IV.

Either all Qualities are occult, or none of them are ſo.

SECT. IV.

XII. The ſchool philoſophers call all thoſe qualities occult, which are not reckoned among the four elemental ones, and which do not reſult from the various combinations of theſe elemental ones, becauſe they ſuppoſe their operations move in a line ſuperior to thoſe which may be ſuppoſed to proceed from humidity, dryneſs, cold, heat, hardneſs, ſoftneſs, colour, ſavour, &c. And although it is true, that ſome by purſuing the ſyſtem of aſſigning ſecond qualities, which reſult from the various combinations of the firſt; or third qualities, reſulting from the various combinations of the ſecond; and among theſe third, have placed the wonderful virtues of the load-ſtone, the operation of purges, and others of thoſe which they call occult, and which by theſe means they have attempted to reduce to manifeſt ones; this mode of proceeding, has been aban-

doned by the generality of philoſophers, and with reaſon; for it is very clear, that combine, and recombine, the qualities of humidity, dryneſs, heat, and cold, in what way you will, you will not be able to find out, that they are capable of directing the load-ſtone to the Pole, or of cauſing it to attract iron.

XIII. It is not my intention, to examine the nature and origin of all, or either of theſe qualities; but ſhall only ſay, that they are all equally occult, or are all equally manifeſt. In order to demonſtrate this, we will compare the calefactive virtue of fire which is looked upon as the moſt manifeſt, with the attractive virtue of the load-ſtone, which is reputed the moſt occult. All that is known, or that is taught by the peripatetic doctrine, of the calefactory virtues of fire, may be reduced to this, that it is a property appertaining to that ſubſtance, or a quality that ſprings from, or ariſes out of its form, that produces the effect which we call heat, and that the action with which it cauſes it, is called calefaction; but ſo it is, that it is juſt in the ſame manner that we know the attractive virtue of the load-ſtone; *viz.* that it is a property or quality, ſpringing from, or ariſing out of the form of this entity, that produces the

the ſenſible effect of drawing the iron to it, and that the action with which it cauſes it to approach towards it, is called attraction; it follows then, that we know juſt as much of the attractive virtue of the load-ſtone, as we know of the calefactory virtues of fire; and therefore, both of them are equally occult, and equally manifeſt.

XIV. And if we were to ſpeak the truth, how could we deny, that the quality we call heat is occult, when it is even occult, whether it is or is not a quality? Not only the corpuſcular philoſophers deny it to be poſſeſſed of all quality or form, but many of thoſe who admit thoſe properties to be contained in it, conſtitute the heat to proceed from a vertical, or vibratory motion of the inſenſible particles of the body. And ſo long as we ſhall remain without an argument to convince us of the truth of theſe opinions, we ſhall not know which of them is right.

PARADOX

PARADOX V.

It is falſe, in a general and comprehenſive ſenſe, that Virtue by being united becomes the ſtronger.

SECT. V.

XV. The axiom *Vis unita fortior*, I apprehend, applies more juſtly to civil and political things, than to natural ones. If we attend, we ſhall find that two agents, each of which is ſtrong in proportion to four, by being joined together, will not be ſtronger than in proportion to eight. If two men ſeparately can ſupport but four half hundreds each, by joining them together, you would find them not able to ſupport above eight. It is true, that a man who breaks arrows one by one, cannot break a bundle of arrows tied together, which is the compariſon that Scilurus availed himſelf of (Plut. in Apophth.) to perſuade his ſons to continue in fraternal union; but we ſhould not underſtand by this, that by binding them together, each arrow ſeparately acquired any additional ſtrength, for this example was only intended to ſhew, that he who could with eaſe break each arrow ſeparately, was not ſufficiently ſtrong to break the whole bundle united together. Suppoſe, for inſtance,

inſtance, the bundle was to conſiſt of twenty arrows, if there was any thing leſs than a twentieth part of the force exerted to break a ſingle arrow, than it was neceſſary to exert to break the whole bundle, it is as certain that that ſingle arrow would not be broke, as that the whole bundle would not. Thus this example does not prove, that there is any additional virtue or ſtrength added to the wood of which the arrows are made, by uniting them together, but only, that twenty joined together can reſiſt a greater force than one ſingly, which is a thing that is ſelf-evident.

XVI. Nothing can be plainer than this; but abſtracted from the force of this reaſoning, experience has ſhewn us, that in ſome agents, in contradiction to the common opinion, their union has diminiſhed their ſtrength. It is the general ſentiment, that two threads twiſted together and united in one cord, will ſupport more weight than they will ſeparately; and that a rope made of many fine threads, is ſtronger than all theſe threads divided. Monſ. Reamur, of the Academy Royal of Sciences, demonſtrated in 1711, that the fact was quite otherwiſe, and that the threads ſeparate would ſupport a greater weight than they would united. He made this experiment

experiment with two ſingle threads, and found that each by itſelf would ſupport nine pounds and a half, which put together make nineteen pounds; after this he cauſed them to be twiſted together, and they were broke with ſixteen pounds. He made another experiment with three threads, one of which ſupported ſix pounds and a half; another eight, and another eight and a half; the ſum of all which put together amounted to twenty-three pounds; and after cauſing them to be made into a cord, they would not ſuſtain more than ſeventeen.

XVII. It may perhaps be anſwered to this, that the threads in twiſting them together might be ſtretched and made finer, and their ſtrength weakened; and that beſides this, they might have been ſtrained by ſupporting the weight in the firſt inſtance; but this objection, although ſpecious, is inſufficient; for by attending to the relation of this matter in the Hiſtory of the Academy Royal, we ſhall find, that by order of the Academy, another experiment was made in a quite oppoſite way, for a ſmall ſilk cord which ſupported a little more than five pounds, was afterwards untwiſted, and they found that the ſingle threads among them all ſuſtained ſix pounds and a half.

XVIII. The

XVIII. The true cauſe of this phenomenon in my judgment, is, that the threads in the twiſted cord do not bear equally alike, becauſe it ſeems to me morally impoſſible in the twiſting, to preſerve the exact length or bearing of all the fibres, but that ſome of them muſt be more tenſe or tight, and ſome of them more ſlack than others; in conſequence of which, the bearing of ſome muſt vary more from the perpendicular or central line of gravity, than that of the others, and that ſome part of them are upon the ſtretch, and others rather ſlack at one and the ſame time. From hence it follows, that the weight at firſt is not ſupported by all the fibres, but only by thoſe which are the moſt tenſe, and the leaſt diſtant from the central line of gravity, which not being of themſelves ſufficient to reſiſt the ſtrain, give way, and that the weight afterwards falling upon the others, they do the ſame; and that this is the caſe may be evidently ſeen, by obſerving when more weight is hung to a rope than it is able to ſuſtain, it does not break inſtantly, but ſucceſſively, and although the total ſeparation is performed in a very little time, there is ſpace enough before it is compleated, for us to perceive, that ſome threads break firſt, and others afterwards.

XIX. But

XIX. But although my opinion ſhould not exactly coincide with the experiments made in the academy, I conclude, that the judgment we ſhould make of this matter is, that both in this, and all other phyſical agents, virtue united is the ſame that it is ſeparate; for the cord breaking with a leſs weight than the threads ſuſtained ſeparate, did not reſult from theſe laſt being ſtronger ſeparate than they were united, but from the fibres of the threads acting more together in their ſeparate ſtate, than they did in their united one, as in the laſt caſe, the reſiſtance of the fibres to the force, was made more in ſucceſſion than it was in the firſt; or to ſpeak more properly, although the threads were united in the cord, their power or virtue of reſiſtance to the force, was not united or exerted together.

PARADOX VI.

The Sun in conſequence of its own proper Nature, and intrinſic Diſpoſition, heats and enlightens unequally at different Times.

SECT. VI.

XX. The common cauſes of our experiencing more or leſs heat, or more or leſs light from the ſun, are the ſerene or loaded ſtate of the

atmoſphere; the oblique direction with which the ſun's rays are reflected on us; the poſition, or ſituation of places; the length or ſhortneſs of the days; the tranquillity or agitation of the winds, and our vicinity to cold or warm places, ſuch as ſnowy mountains, or warm ſubterraneous effluvia. But, abſtracted from any of theſe ſublunary or inferior cauſes, I ſay, that in the ſun itſelf, is contained a cauſe, that occaſions it to reflect more or leſs light or heat, and that it actually does reflect more or leſs light and heat, at ſome times than it does at others, and that this is in virtue of its own proper nature and diſpoſition.

XXI. The reaſon of which phenomenon is, the tranſitory ſpots, which the aſtronomers have for ſome time paſt obſerved in the ſun. Theſe are a ſort of darkiſh places, unequal in ſize and duration, which ſeem as if they were on the ſuperficies of the ſtar, and which at different times are more or leſs numerous, although it has happened, that for years together none of them have appeared. Some believe that the antient Chaldeans had ſome knowledge of them, for in the Book of Job, we read the following expreſſion of Job's friend Eliphaz to him, that the Heavens themſeves are not exempt from their ſpots: *Cœli non ſunt mundi*

in

in conſpectu ejus. On the other hand, the want of teleſcopes among the ancients, did not render their making obſervations on theſe things impoſſible; for ſome of theſe ſpots are ſo large, as to be viſible without a teleſcope; as for example that was, which was ſeen in the year 1706, whoſe ſuperficies according to the computation of the aſtronomers, was thirty-ſix times larger than the whole earth; and when they arrive at this magnitude, or if they are even much leſs, they may be diſcerned, by looking at the ſun with a glaſs tinged with any dark colour.

XXII. But the firſt perſon we have any account of, who obſerved theſe ſpots, was Father Chriſtopher Scheinerus a jeſuit, who applied himſelf to it with ſuch diligence, that between the years 1611 and 1627 he had made fourteen hundred obſervations of them, which he gives an account of in his *Roſa Urſina*. The celebrated Galileus Galilei began alſo to obſerve them about the ſame time that Scheinerus did; and ſince them, the moſt laborious aſtronomers of the laſt and the preſent century, have applied themſelves to making the ſame obſervations; ſo that this is a matter, which at preſent there is not the leaſt doubt about; and although ſome have entertained ſuſpicions whether theſe ſpots were in the body of the ſun, or at a little diſtance from it; others have removed thoſe diffi-

culties, by demonſtrating, that they are inherent in, and exiſt on, the ſuperficies of the ſun; for they not only revolve in the ſame proportion the ſun does, but they moſt probably remain upon it during the whole time it takes in making an intire revolution, which it does in twenty-ſeven days, and they are to be ſeen compleat for half the time of that period; which could not happen, if the ſpots were inferior to the ſtar.

XXIII. And whether theſe ſpots are ſooty or ſmoaky vapours, which ariſe from the great furnace of the ſun, as ſome think, or are any other different thing; it is clear, that during their continuance, the light and the heat of it reflected on the lower elemental regions, muſt be diminiſhed in proportion to the ſize and number of the ſpots; and to this cauſe may be attributed, ſome of the notable diminutions of the light and heat of the ſun, which we find recorded in hiſtory, provided they were not occaſioned by ſome obſtructions in the atmoſphere. Mayolus tells us, that in the time of the emperor Juſtinian, the light of the ſun for the greateſt part of a year was ſo dim and faint, that it ſcarce exceeded that of the moon; and Plutarch tells us, that at the time of the death of Julius Cæſar, the light of the ſun was equally feeble for a whole year together; which Virgil alſo takes notice

notice of in the following verſes of the Second Book of his Georgics:

Ille etiam extincto miſeratus Cæſare Romam
Tunc caput obſcura nitidum ferrugine texit:
Impiaque æternam timuerunt ſæcula noctem.

PARADOX VII.

The Rays of the Sun reflected on a Concave Body, produce a greater Heat in Winter than in Summer, which Heat is greater ſtill in Proportion to the coldneſs of the weather.

XXIV. The experiments to prove this, were to the admiration of all the by-ſtanders, repeatedly made with the burning-glaſs of Monſ. Villete, which we have ſpoken of before; and it was obſerved at the time of making them, that by ſo much the more cold the burning-glaſs was, by ſo much the quicker and ſtronger was the operation of the focus; and that by ſo much the warmer it was, by ſo much the more tardy and remiſs were its effects. Among thoſe who read theſe accounts, ſome looked upon them as wonderful, and others as incredible.

XXV. But with all this, the reaſon of the phenomenon is not very hidden. It is certain, that cold condenſes bodies, and that heat dilates them. It is alſo certain, that the more denſe a body is, the more apt and fit it is to cauſe reflection, and that it is leaſt ſo, the more lax it is. From theſe two premiſes it may be clearly inferred, that the effects we have mentioned were things of courſe; but for a further explanation of this matter, I will ſay they were ſo from two cauſes; for the burning-glaſs by being in a warm ſtate, muſt conſequently be leſs compact and hard, and the operations of its focus more remiſs and languid. In the firſt place, becauſe a great portion of the rays were abſorbed in the pores of the metal, which had been dilated by the heat, and made no reflection at all. Secondly, by their being dilated, and as we may ſay, become more ſpungy, the concave ſuperficies of the metal were leſs ſmooth and equal, from whence it would follow, that many rays by being obſtructed in their deſcent by ſome inſenſible prominences, would not make their reflection in a right line on the point of the focus. This may be better underſtood, by attending to the reflections of a ball, that is ſtruck againſt a wall with an unequal ſurface; and it is a poſition agreed to by all the mathematicians who have

have treated of catoptrics, that light and heat in their reflections, follow exactly the same rules, that heavy bodies do.

XXVI. Nor is there are any difficulty in supposing, that a body as hard as metal, may undergo some insensible rarefaction when it grows warm; for in the first place, if a very intense heat can dilate metal, so as to make it break all its ligatures and become fluid, a less heat would have the same effect, in proportion to the degree of it, and might dilate and rarefy it a little. Secondly, experience teaches us, that every sort of metal is more sonorous when it is cold, than when it is warm; from whence it may be evidently inferred, that heat and cold do somewhat alter its texture; it being certain, that upon the texture, depends its being more or less sonorous.

PARADOX VIII.

A flame extending itself upwards in a pyramidical or conic form, is occasioned by a violence done to the flame itself.

SECT. VIII.

XXVII. The endeavour of the flame to ascend, is the proof which is vulgarly exhibited,

of there being an element or ſphere of fire above us, by thoſe who maintain that poſition; but we ſhall ſhew, that this is a very feeble proof, even admitting their own ſtate of the caſe, becauſe every thing that is lighter than the fluid that ſurrounds it, will, if it is not by violence reſtrained from doing ſo, riſe above it, without being invited to aſcend by a ſphere of its own ſpecies that is aloft; and it is from hence, that flame, ſmoke, vapour, an infinity of elemental effluvia, and divers other ſpecies of things aſcend, without the aſſiſtance or intervention of any other cauſe, except that of their being lighter than the inferior groſs air.

XXVIII. To this we ſhall add, that there is not in the flame, the propenſity to aſcend which they ſuppoſe, and which ſeems to be indicated by its riſing upwards in a conic form; for this aſcent is violent, and not natural to the flame. We ſhall illuſtrate this paradox, by an experiment which my Lord Bacon mentions in the firſt Book of his Centuries. A ſmall wax candle, fitted into an iron tube, and placed perpendicular in a veſſel filled with ſpirit of wine, in which it muſt be immerſed to ſuch a depth, that when they are both ſet fire to, the flame of the candle ſhall not riſe higher than that of the ſpirit; and you will ſee, the flame of the candle

candle and that of the ſpirit being diſtinguiſhable by their different colour, that the flame of the candle will appear in the middle of that of the ſpirit, extending itſelf in breadth, and not in a pyramidical, but a round form, that occupies four or five times as much ſpace, as that which it uſed to occupy when burning in the open air. This experiment proves, that the pyramidical form which the flame regularly aſſumes, is cauſed by the preſſure of the air that ſurrounds it; and this is the ſentiment of the modern philoſophers, who without adverting to the experiment we have mentioned, would make no ſcruple of pronouncing, that the form it aſſumes is a violence done the flame.

XXIX. By this example it may be ſeen, that experiments, provided they are made with judgment, and attended to with ſubtil reflection, are the only means by which we can attain any certain knowledge of natural things; but if they are made in a lumping way, and without due attention, and exactneſs, they are the occaſion of innumerable errors. Many have ariſen, from attributing to a native inclination, or intrinſic virtue of ſome body, effects, which are only cauſed by the impulſe of ſome other neighbouring body. Before the gravity and elaſticity

city of the air were discovered, it was looked upon as a thing demonstrated by experience, that the water's rising in the pump, was from its inclination to obstruct or oppose a vacuum, and now it is a thing evinced by experience, that the air is what impels it to that ascent.

PARADOX IX.

In the composition of all vegetables, there is contained a portion of metal.

SECT. IX.

XXX. This is a novelty in physics, which has not been discovered till of late years. Monsr. Gofredy of the Academy Royal, having examined the ashes of many different plants, found in them all, some fine particles that would adhere to the load-stone; from whence he concluded, that these particles were either particles of iron, or else were particles of the load-stone itself. But, as it was a doubt which had never yet been cleared up, whether the load-stone would not attract other metallic particles, which were not part of itself, nor of iron; the Lemeries father and son, made some fresh enquiries, which removed all doubts respecting the matter. They with a burning-glass melted the

the particles which the load-ſtone had attracted from the aſhes of the plants; which after much ſparkling, liquefied into the very form and ſubſtance of the load-ſtone, and of iron alſo; and when grown cold, formed a lump of the conſiſtence and hardneſs of metal. Even in honey, after it has been diſtilled, have been found theſe particles which were attractable by the load-ſtone; from whence it may be inferred, that this metallic compoſition, exiſts in, and is diffuſed through the moſt ſubtil juice of flowers and bloſſoms.

XXXI. But, after all this had been done, it ſtill remained to be aſcertained, whether theſe particles pre-exiſted in the plant; or were the production of the fire, and the reſult of their calcination; which ſecond opinion appeared the moſt probable, becauſe there ſeems no difficulty in ſuppoſing, that the fire might tranſmute into metal ſome of the particles of vegetables; but there appeared a very great one, in conjecturing that ſo heavy a metal as iron, could riſe to the ſummit of trees, and pervade the moſt ſubtil fibres of their leaves.

XXXII. Monſ. Lemeri the ſon cleared up this doubt, by various ſubtil and curious experiments, which not only evinced the volatility of iron, but

but alſo excited a belief, that this metal contributed greatly to promote the vegetation of all kinds of plants. The moſt remarkable experiment he made was the following one. Having poured ſpirit of nitre upon the filings of iron, there ſucceeded a violent effervescence, which after ſome time ceaſed, and left the metal diſſolved into a red liquid; by afterwards pouring oil of tartar per deliquium to this liquid, another fermentation was excited, which went on increaſing, till, at laſt, it formed on the ſides of the veſſel, various ſubtil branches, which after all the ſenſible fermentation had ceaſed, continued to grow till they reached the top of the veſſel.

XXXIII. And although the firſt time he made this experiment, he obtained only the rude lineaments of a tree, by varying afterwards the quantity of the oil of tartar, till he hit upon the juſt proportion of it, he obtained a perfect metallic vegetation, and produced a tree completely formed, with its roots, trunks, branches, leaves, and flowers. This able chymiſt concluded from his various obſervations on this matter, that both the volatility, and the vegetation, were owing to the filings of the iron; for without them, he could only produce ſome cryſtalline lumps at the bottom of the veſſel, which

which he concluded proceeded from the nitre that had been diſſolved. Whoever is deſirous of knowing more of the manner and effects of theſe operations, may read the accounts of them in the Journals of the Academy Royal, of November 1706.

XXXIV. But we are not to conclude from hence, that metallic vegetation is only to be produced by iron. The Abbé Vallemont in his firſt volume, *on the natural Curioſities and Art of Agriculture*, ſays, that there were exhibited at Paris, ſuch like artificial metallic vegetations, produced from gold, ſilver, iron, and copper. But that which was the moſt common, and the moſt in vogue there, was the vegetation procured from ſilver, which the chymiſts called the *Tree of Diana*; and which was produced in the following manner. Diſſolve an ounce of ſilver, in two or three ounces of ſpirit of nitre. Evaporate this diſſolution in a ſand-heat; till nearly half of it is conſumed. Mix the remainder in a veſſel, properly proportioned and ſuited for the buſineſs, with twenty ounces of clear water, and two ounces of quick-ſilver. By leaving this mixture afterwards in a ſtate of reſt for forty days, a ſilver tree will grow, and in that ſpace of time will be compleatly formed, very nearly reſembling a natural one, in ſhape and figure.

figure. Monſ. Homberg, a celebrated chymiſt of the Academy Royal, by making uſe of the ſame materials, contrived to form a metallic tree in leſs than a quarter of an hour; the receipt for doing which, together with the phyſical explanation of this phenomenon, given by Monſ. Homberg, may be ſeen in the Memoirs of the Academy Royal, of the thirteenth of November 1692.

XXXV. Theſe metallic vegetations, joined to the diſcovery beforementioned, of our having found iron in the aſhes of all ſorts of plants, not only prove that metals may, by virtue of certain fermentations, be made ſufficiently volatile to enable them to riſe upwards, and pervade all the tubes through which the alimentary juices of plants circulate, but alſo make it probable, that to this metallic mixture, they in great meaſure owe their vegetation.

XXXVI. This is the ſubſtance of what, in ſupport of this paradox, I have found in the Works of the before-quoted philoſophers; to which I ſhall add a conjecture of my own, which appears to me very efficacious to render credible, the formal exiſtence of particles of iron, or load-ſtone, in all vegetables whatever; whether they are of load-ſtone, or iron,

iron, makes very little difference, as all experimental philoſophers are agreed, that load-ſtone is nothing elſe but a fat or rich vein of iron.

XXXVII. My conjecture is founded on a theory, which is embraced at preſent by all the mathematicians, and confirmed by concluſive reaſonings, which are founded on the earth being endued with a magnetic virtue. The truth of this theory, is proved by innumerable obſervations. It has been found, that the magnetic needle poiſed in equilibrio, accommodates itſelf to the meridian of the earth, in the ſame manner the load-ſtone does, that is, it does not point to the poles of the heavens, but to thoſe of the earth; for it has been obſerved in the northern regions, that it does not appear to elevate or point towards the pole of the heavens, but rather ſeems to depreſs, or point down towards that of the earth; and generally, in all, and every particular, the magnetic needle has been found to be affected in the ſame proportions with reſpect to the terraqueous poles, that it is with reſpect to the load-ſtone. The various declinations that it is liable to, from the pole of the earth, in different places, cannot be attributed to any other cauſe, than that of the unequal magnetiſm, of the terraqueous globe in different regions; and the different declina-

tions of the poles of the load-ſtone are attributed to the unequal magnetiſm or perfection of the parts of the ſtone. It has been found, that the earth itſelf, can communicate the magnetic virtue to iron; for if you take a bar of iron red-hot from the forge, and place it perpendicular in the earth, and there let it remain till it becomes cold, it will manifeſtly acquire the magnetic virtue; and if it is afterwards poiſed in equilibrio, it will point to the poles of the earth, in the ſame manner as if it had been touched by a load-ſtone. It will alſo acquire the ſame virtue, if it has remained for many years in a perpendicular poſition, without its having been placed ſo in the earth red-hot; and the ſame has been experienced with reſpect to bars, that have been ſet before windows in an upright poſition. The ſame effect will alſo be produced, by laying a hot bar upon the ground, exactly in a north and ſouth direction, till it gets cold; but if it is ſo laid without being previouſly heated, and ſuffered to continue in that poſition for ſeveral years together, it will be found to be impregnated with the magnetic virtue. Whoever is deſirous of ſeeing an acount of theſe obſervations more at large, and to ſatisfy himſelf how they evince the magnetical quality of the earth, ſhould read the mathematical authors who treat of the load-ſtone, and he will find, that all the modern ones make ſome remarks upon that particular.

XXXVIII.

XXXVIII. This magnetic property of the terraqueous globe being admitted, it may be inferred from it, that excepting the exterior cruſt of the earth, which is compoſed of ſuch heterogeneous parts, as are neceſſary for the growth and increaſe of the various productions and mixtures with which it abounds, all the reſt, is nothing elſe, but a ſolid quarry of load-ſtone; and this is the opinion that is ſtrenuouſly maintained by ſome; although there are others, who think that the magnetic virtue, is diſtributed through all the parts of the terraqueous globe.

XXXIX. Both theſe opinions may be right, for they do not ſeem incompatible one with another; but in favour of the ſecond, which is that which conduces beſt to ſupport my ſentiment, we may urge another celebrated piece of experience, which evinces efficaciouſly, that this very exterior earth which we touch and ſtand on, is impregnated with many inſenſible particles of load-ſtone or iron; and this is manifeſt, from the earth itſelf being endued with this magnetic virtue, or inclination of pointing to the pole; for bricks that are made from it, and are well burned and purged or freed from all foreign humour or moiſture, and eſpecially

if they are made long and narrow, by being touched with a load-ſtone will acquire the virtue of pointing to the poles; and they will even acquire it without being touched, if they are laid in a north and ſouth poſition, and ſuffered to continue ſo for many years together. (See Father Dechales, lib. 1 & 2, de Magnete.) It being then certain, that this quality of pointing to the pole, is peculiar to the load-ſtone, or the iron, and incommunicable to all other ſubſtances, it muſt evidently be inferred from this property in the bricks, that the very earth we touch and ſtand upon, is impregnated with particles of load-ſtone or iron. All vegetables then receiving their nouriſhment from the earth, it is not wonderful that there ſhould be found in them all, ſome of theſe particles.

XL. I would recommend it to thoſe who take delight in philoſophy, to endeavour to inform themſelves, whether it is not probable, that all other mixtures are impregnated with theſe particles; for if that ſhould be found to be the caſe, we ſhould diſcover the cauſe of the deſcent of heavy bodies; for there being in the earth the magnetic virtue, and in all other mixtures particles of iron, in ſpite of all our endeavours to ſeparate them, they always would be brought together again by attraction. But

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as he who is a lover of the truth, ſhould conceal no objection that may be made to any ſuppoſition that he advances, I will not diſſemble, that I find a terrible one againſt this idea of mine; which is, that according to this ſyſtem, iron ſhould be heavier than gold; for although we ſhould admit, that ſome iron, or magnetic particles are mixed with the gold, it is not credible, that the quantity of them ſhould be equal to thoſe in the iron itſelf; for if that was the caſe, the load-ſtone would attract the gold, as it does the iron. But whether there is in the terraqueous globe, another attractive quality diſtinct in kind from that of the load-ſtone, in virtue of which, all bodies may be diſpoſed to approach it which we call heavy, by having in themſelves a propenſity to do it correſpondent to that there is between the load-ſtone and the iron, is very difficult to be proved.

ON SCEPTICAL PHILOSOPHY.

I. THERE is so great a latitude in scepticism, and its gradations are so different, that according to the various extension that is given to the meaning of the word, it is used, to describe the most extravagant error, and the most prudent mode of philosophizing. Rigid scepticism is a wild delirium, moderate is prudent caution. But those who in this age, have undertaken to combat the moderate sceptics, have either from ignorance or malice, confounded them with the rigid. When I reflect how gross a thing ignorance must be in such a case, it makes me think they acted from malice, and when I consider how detestable a thing malice is, it makes me conclude what they did was through ignorance.

II. Although the Greek word *scepsis*, from whence sceptic and scepticism are derived, signifies inquisition, investigation, and speculation, custom has in a great measure altered the meaning of the term; on which account, sceptical

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at this day, implies doubt, or doubting; and ſcepticiſm, that particular avowal which ſceptics make of doubting, or withholding their aſſent to all matters, that are liable to be controverted or diſputed.

III. This doubt or ſuſpenſion of aſſent, may be more or leſs rational, in proportion to the greater or leſs extent that is given to it, or according to the matters to which it relates. Thus, although doubting of many things would be prudence, doubting of all would be madneſs.

SECT. II.

IV. And although authors commonly repreſent to us, ſome ſubtil philoſophers of antiquity, as obſtinately perſiſting in ſuſpending their aſſent to every thing that was propoſed to them, and which was evident both to their reaſon, and their ſenſes, and likewiſe repreſent them, as earneſt defenders of univerſal ſcepticiſm, to which opinion they refuſe to admit of the leaſt exception; yet for all this, it is very doubtful to me, whether theſe were their real ſentiments; and I am rather inclined to think, they did it, to ſhew their ingenuity, and to diſplay their talent for diſputing; or that from ſome other motive, they ſpoke differently from what they

thought. The moſt famous among this tribe, were Archeſilaus, Carneades, and Pyrrho. But the firſt, if we believe Sextus Empericus, was in reality a Platoniſt, and only a ſceptic in appearance; whoſe method it was, always to diſpute problematically upon every thing in public, but was ever careful to ſuggeſt in private, to ſuch of his diſciples as he found were the moſt capable, the Platonic doctrine. Cicero ſays, that his zeal for conteſting every thing that was advanced by his ſchool-fellow and rival Zeno, carried him to the dangerous extreme, of endeavouring, although it was againſt the conviction of of his own mind, to refute whatever was advanced by Zeno. We may add to this, that according to the teſtimony of Diogenes Laertius, Archeſilaus never went to the extreme of doubting the evidence of his ſenſes, but rather treated with contempt and deriſion, thoſe who carried ſcepticiſm to that length.

V. Carneades was a moſt ſubtil philoſopher, and ſo eminent as an orator, that Cicero in various parts of his works ſpeaks of him with admiration and envy; and aſſures us, that by the keenneſs of his ingenuity, and the fertile torrent of his elocution, he could perſuade his hearers to believe whatever he thought fit, and Quintilian, and Numenius, declare the ſame; and it is probable, that his propenſity for diſputation,

putation, and his ambition of ſhewing his ingenuity, excited him to conteſt the moſt eſtabliſhed axioms; which together with his affecting to diſtruſt the evidence of his ſenſes, made him paſs for a rigorous ſceptic. But we may venture to aſſert, that if an hiſtorical anecdote which is related of him by Numenius is to be credited, Carneades believed his eyes as much as any man living; for having ſurprized a concubine of his in the embraces of his beloved diſciple Mentor, he was ſo offended at his treachery, that he broke with him for ever, and excluded him from being the ſucceſſor to his academy. How happened it then, that like a good ſceptic, he did not doubt whether the repreſentation of that obſcenity, might not be a *deceptio viſus?* I for my own part am inclined to think, that there never yet was a ſceptic in the world, who after the exhibition of ſuch evidence, could maintain his heart and his mind in a ſtate of ſuſpence.

VI. It is commonly ſaid of Pyrrho, who was by ſo much the moſt famous of all the ſceptics, that he in a manner obſcured the others, by giving his name to the ſyſtem of univerſal doubt, which at this day is called Pyrrhoniſm, and the ſectaries of it Pyrrhoniſts; and he was ſo poſitive in maintaining, that we ſhould

ſuſpend our opinion, with reſpect to all we ſaw, or felt, that he would not turn the leaſt aſide, to avoid being run over by a mad horſe, or bit by a mad dog; nor would he ſlacken his pace, although he was warned that he was advancing near the edge of a precipice; and that he would have periſhed a thouſand times by theſe dangers, if his friends, who were attentive to his ſafety, had not prevented his running headlong into them. But although this account of him is much vulgarized, I do not know whether any other antient author, except Antigonous Caryſtius, a Greek hiſtorian, who was contemporary with, or lived very nearly in the days of Pyrrho, has vouched the truth of it; at leaſt the learned La Mothe de la Vayer, quotes him as the only author, who atteſts the relation; and it is even doubtful whether Antigonus Caryſtius aſſerts the thing poſitively, becauſe in the *Præparat. Evang. lib.* 14. *cap.* 18. of Euſebius, we find this author quoted for a fact, which contradicts that relation; which is, that Pyrrho, when a dog was once about to run at him, climbed up a tree to get out of his way, and avoid the danger. Upon which occaſion, thoſe who were preſent, raillied him upon the difference there was between his doctrine and his practice.

VII. But let Antigonus Caryſtius, who is an author I have not ſeen, or any other whatever, ſay

ſay what they will, to give ſanction to this relation, we may without the apprehenſion of being accuſed of injuſtice, condemn as incredible, the account of Pyrrho's having carried his extravagance to ſuch a length. This philoſopher lived to the age of ninety, and through the whole courſe of ſo long a life, it is not probable, he ſhould always have friends at his elbow, ready to ſave him from the many dangers, to which a man of ſo raſh a conduct muſt unavoidably have been very frequently expoſed, and eſpecially, in the long voyage he made to India to conſult the Gymnoſophiſts. Diogenes Laertius, who is the perſon that gives us the account of the great age to which Pyrrho lived, and of his voyage to India, aſſures us, that Pyrrho led a very ſolitary and retired life, which is not very compatible with his having always been attended by his friends, nor is it reaſonable to conclude, that a man who was ſo very ridiculous as he is deſcribed to have been, could have very many, or very ſincere ones. Finally, the citizens of Elis, his countrymen, elected him the high prieſt of their religion. Now how is it credible, that they ſhould have confided ſuch an employment to a perſon, who if his ſcepticiſm had been carried to the length we have mentioned, they muſt certainly have looked upon as a mad man? From this circumſtance, it may alſo be inferred, that the charge of

of impiety, which was generally imputed to him, was an unjuſt one; becauſe his countrymen would hardly have elected him the ſupreme miniſter of their religion, if they had known that he profeſſed to be of no religion at all, and that he doubted the exiſtence of a deity. What devotion or zeal could they expect for the ſervice of the temple, from a man, who either was ignorant of, or doubted whether the object of their worſhip exiſted?

SECT. III.

VIII. I not only think, that theſe philoſophers did not in their hearts, adopt the ſyſtem of univerſal doubt; but I alſo believe, there never was any one who ſincerely did it; becauſe there are objects, with reſpect to which, there can be no doubt but by implication. No one, for example, can doubt of his own exiſtence. The very act of doubting, is affirmative of a certain knowledge, becauſe he who doubts, muſt certainly be convinced that he does doubt; and if the ſceptics are not certain that they doubt, how can they affirm they do with ſuch obſtinacy and ſtiffneſs? Therefore we ſhould conclude, that it is not from ſentiment, but from their fondneſs for diſputation, that ſome of them defend the ſyſtem of univerſal ſcepticiſm; and if there ever was any one who truly aſſented to it,

it, we ſhould not conſider him as a philoſopher, but as a lunatic; for it would be improper to call maintaining ſuch a ſyſtem, a particular mode of philoſophizing, as we ought with more juſtice, to term it a particular mode of raving.

IX. It is moſt likely then, that the moſt rigid ſceptics, and thoſe who were truly and *bona fide* ſuch, admitted of ſome exceptions to the univerſality of their ſyſtem, or underſtood it in ſome determined ſenſe, which limited or reſtrained it. Socrates, whom ſome look upon as the primitive father of the ſceptics, ſaid of himſelf, that he knew nothing with certainty, except it was his ignorance of all things. This however, was placing ſome ſort of limitation to the ſyſtem, although it was but a very ſmall one. But I am of opinion, that Socrates, who was a very modeſt man, only meant to ſay, that what he knew amounted to but a ſmall matter, and that therefore we ought to underſtand his declaring himſelf totally ignorant, as an hyperbolical expreſſion. Saint Juſtin the martyr, and other fathers who highly applauded that philoſopher, would not have done it, if they had taken him for a rigid ſceptic, which would have amounted to the ſame, as his having been an impious man; becauſe it is evident, that he who doubts of every thing, cannot be a perſon of any religious

gious principles; but he was so far from such a kind of man, that it is most probable, the Athenians condemned him to death, because he affirmed the existence of one only God. It is at least certain, that he treated the multifarious number of the heathen gods with great derision; from whence we should conclude, that he knew this important truth, that the Godhead admits of no multiplication.

X. Other sceptics, who said that they doubted of every thing, and that we ought to doubt of every thing, did not perhaps mean to exclude all certainty, but only scientific and demonstrative certainty, which except in mathematical cases, we must confess is very rare to be found. Even many mathematical demonstrations, and especially those which are very complicated, are not exempt from the suspicion, of there being some occult fallacy contained in them, on which account they ceased to be true demonstrations. How many have presumed to demonstrate they could square the circle, whose modes of doing it, and their reasonings upon the subject, when they came to be submitted to rigorous examination, have been found to have some sophism involved in them, or to have been built upon some supposition which was taken for certain, when in reality it was not so. The geometrical demonstrations, with which they prove the infinite

finite divisibility of the continued quantity, are sufficiently simple; notwithstanding which, there are authors, who because the infinite divisibility of the quantity is imperceptible, suspect, that there is some occult sophistry involved in those demonstrations.

XI. Others have refused to credit the evidence of their senses; but not so grosly, but that they have condescended to make use of them to direct their actions in the common affairs of civil and human life. They govern themselves by them for the purpose of living, but not for that of philosophizing. The information of their senses serves them to chuse the useful, and avoid the pernicious, but not to determine the theory of an object.

XII. The arguments they assign for this distrust of their senses in the last instance, may be reduced to three. The first is, the distinction we should admit between the impression which objects make on our senses, and the absolute essence or quality contained in the objects themselves. For example, we say that hemlock is bitter. If by this expression, we mean to declare, that this herb makes on our palate a determined impression or sensation, which we call bitterness, we speak properly; but if we mean to say that the herb in itself contains an absolute

lute quality, which we describe by the same name, we speak improperly; for if this was the case, all the animals who relish hemlock would find it bitter; but it happens otherwise, for the goats are fond of it, and eat it greedily. In the same manner do all those reason, who adopt this mode of arguing with respect to all other sensible species. They say, the fire produces in us that kind of impression, which we call heat; but that we ought not from thence to conclude, that it is hot in itself. Thus although by approaching very near to it, it produces pain in us, still it is not sensible of any itself. Therefore we ought not for this reason, to say the fire contains pain, it being at most only capable of occasioning pain; neither ought we to call it hot, but only capable of producing heat; nor can we call it hot but by equivocation, as we say, Medicine is healthy, because it produces health in the animal.

XIII. This distinction is the fundamental maxim, by which the modern philosophers maintain their rejection of all the sensible qualities, which are assigned by Aristotle and his followers to objects; and they carry the matter so far, that they will positively assert to you, that neither snow is white, nor charcoal black, nor a bell sonorous, nor a flower fragrant; and if you mean

mean to expreſs by theſe denominations, intrinſic qualities, or ſuch as proceed from ſome accidental intrinſic form contained in objects; they will not allow ſuch deſcriptions of things to be good and valid, but only ſo far as they ſignify certain determined impreſſions, which by means of the phyſical and corporeal impulſe of the inſenſible particles of matter, are made on our organs, which are of the ſame uſe to us, to enable us to chuſe the good, and avoid the pernicious, as our knowledge of the real intrinſic forms would be. They proceed to aſſert, that men would equally abſtain from eating arſenic, if they believed the moderns, who ſay this mineral kills by diſſolving the blood, by the rapid motion of its particles; as they would by believing Ariſtotle, who imputes all the miſchief it occaſions to be the effect of a venomous quality exiſting in the arſenic, and that they would be equally anxious to acquire gold, by believing the moderns, who ſay its brilliant yellow hue is the effect of a determined impreſſion made by the light on the retina, where it appears reflected in that colour, from the particular texture of the inſenſible particles of the gold, as they would, by believing Ariſtotle, who ſays, the colour proceeds from an accidental form, inherent in the gold itſelf. I know very well, that a learned philoſopher ſaid, a little while ago,

ago, that the ladies had great reaſon to complain of Deſcartes, for having taken from their faces that delicate ſmooth whiteneſs which makes them look ſo tempting, and for having placed it in their admirer's eyes. But although this may do very well as a joke, it is certain, that the charm has an equal effect to make them appear deſirable, whether it is ſtamped on the eyes, by the particular reflection, which, by the determined texture of the inſenſible particles of the ſkin, is made by the light, or whether it is produced by the intrinſic quality, which the Ariſtotelicans aſſign as the cauſe of colours; and I much doubt, whether to this day, the Cartheſian philoſophy has ſerved any man as a preſervative, againſt the venom of that ſweet poiſon, which we call beauty.

SECT. IV.

XIV. The ſecond reaſon aſſigned for diſtruſting the evidence of our ſenſes, is the experience we have of the alterations which are produced on ſenſible ſpecies, either by the interpoſition of a medium, or the different diſpoſitions of our organs. The ſpecies, which by paſſing through a uniform, or homogeneous medium, appears ſtraight, by being paſſed through a different one, will ſeem crooked, as may be evinced by paſſing a ſtraight wand from the air through water, which,

which, by virtue of the refraction of rays produced in its paſſage from one element to the other, will make it appear crooked. To him who has a jaundice, every thing he looks at ſeems yellow; and although it is true, that this is the effect of a preternatural accident, we are not certain, whether abſtracted from all morbific diſpoſitions, there are not in various individuals, different temperaments and configuration of parts, which are capable of producing different ſenſations with reſpect to the ſame object; and it ſeems moſt probable, from all that is evident and manifeſt to our obſervation and experience, that the thing is ſo, for we don't ſee any one individual, who is perfectly and exactly like another; and we have known men, whoſe right eyes have repreſented objects, both with reſpect to colour and magnitude, different from their left.

SECT. V.

XV. The third ground for the ſaid diſtruſt, is derived from the erroneous repreſentation of things made by the imaginary faculty, which fancies external ſenſations of objects that do not exiſt. Such, for example, as the imagination of him who has had a leg cut off, repreſenting to him a pain in the leg or foot that has been amputated; or that of an hypocondriac perſon, who

fancies himſelf to be glaſs, earthen ware, a wolf, or a dog, whoſe imagination repreſents thoſe ſtrange forms, as evidently and manifeſtly palpable to his ſenſes; ſo that he who fancies himſelf glaſs, will ſwear with invincible firmneſs, that he perceives in his own perſon the tranſparency, and feels on his own ſkin the ſmooth ſurface, which is proper and peculiar to that artificial compoſition.

XVI. This error is common to all men in their wanderings when they are aſleep; becauſe he who dreams, believes he perceives thoſe objects with his ſenſes, which he only perceives with his imagination; and from hence, the rigid ſceptics deduce a moſt pernicious argument, by way of proving, that we ſhould doubt of every thing; becauſe they ſay no man can be poſitively certain, whether he is aſleep or awake; according to which mode of reaſoning, no one can be certain, whether he ſees, hears, or touches any thing whatever; for notwithſtanding his having the greateſt confidence that he is awake, it is poſſible that he may be ſleeping; and that the things which are repreſented to him as ſeen, heard, &c. are all imaginary. For example, I conſider myſelf as now writing, and reading what I write. But what certainty have I that I am writing and reading? Have not I dreamed a thou-

a thouſand times, that I was reading and writing? And at thoſe times, ſuch occupations appeared to me, not as things that I was dreaming of, but as exerciſes that I was really and actually practiſing; and therefore, that may be the caſe with me at preſent.

XVII. I have ſaid already, and with reaſon, that this argument is a moſt pernicious and dangerous one; for whatever anſwer you make to it, your adverſary turns upon you, and urges the oppoſite opinion as forcibly, as you can ſupport your reply. At leaſt I have never ſeen any ſolution of this matter, which could more or leſs vanquiſh the force of the difficulty. It has been objected to this ſort of reaſoning, that the argument proves too much, and tends to involve in, and reduce to the ſame ſtate of doubt, all the ſacred dogmas of religion. This remark is a juſt one, for he who comes to doubt, whether all he hears or ſees is not a mere imaginary repreſentation, muſt neceſſarily doubt of the reality of all the inſtruction he has received, both with reſpect to religion, and every other matter. But what advantage ſhall we gain, by inſiſting upon this againſt a ſceptic, whoſe intention perhaps is to deſtroy all religion? And although he ſhould not argue with this depraved view, but ſhould reply to theſe ob-

jections out of wantonneſs, or from motives of vanity and oſtentation, and a fondneſs of ſhewing his parts, it would be waſting time to diſpute with him, or to preſs the argument, becauſe theſe inſtances, notwithſtanding they are good ones and may be fairly inſiſted on, are not anſwers.

XVIII. It is certain there are ſome truths, that maugre the clearneſs and confidence with which the underſtanding aſſents to them, are not exempt from being expoſed to difficult objections; or to ſpeak more properly, there is no truth whatever, be it ever ſo firmly eſtabliſhed, againſt which, ſome ſophiſtical objection may not be raiſed. It would therefore not be right upon all occaſions, to give up a maxim, whoſe truth we clearly perceive and are convinced of, only becauſe we can't reply to every argument that may be urged againſt it. There are truths of ſuch a nature, that although they would ſtrike, and be clear to any man of ordinary underſtanding, ſtill, the giving an anſwer to every objection that could be raiſed againſt them, might poſſibly be found a difficult taſk to a perſon of very ſubtil ingenuity. And notwithſtanding we ſhould not be able to hit upon an argument, that would confront or ſilence thoſe which are uſed by the ſceptics, to perſuade

ſuade us to doubt whether we are ſleeping or waking, we ſhould not abandon ourſelves to ſuch a doubt, but ſupport ourſelves in a firm confidence, that we are not miſtaken with reſpect to the ſtate we are in. And in truth, the arguments uſed to make us doubt of it, are not of ſuch a nature, as that a clear, ſolid, and unembarraſſed anſwer may not be given to them.

XIX. And in order to do this, I ſhall begin with ſuppoſing, that evidence in this caſe may be of two ſorts, mediate, and immediate. An evident propoſition, ſupported by immediate evidence, is, when without the aſſiſtance of any kind of proof, it preſents itſelf ſo clearly to our underſtandings, that the mind is conſtrained by invincible neceſſity to aſſent to it. An evident propoſition ſupported by mediate evidence, is, when of itſelf, it is not repreſented to our underſtandings with all this clearneſs, but is neceſſarily inferred from ſome other ſelf-evident propoſition.

XX. I will ſuppoſe, ſecondly, that immediate evidence ſhould be divided, into metaphyſical and experimental. The firſt is governed by univerſal principles, which of themſelves perſuade or convince the underſtanding; ſuch as theſe, the whole is greater than a part; two contra-

dictory propoſitions can't be both true at one and the ſame time. Experimental evidence is derived from certain ſingular truths, which ſtrike every individual with infallible conviction; ſuch as theſe, that I at preſent have ſuch or ſuch a deſire, or that I think of ſuch or ſuch a thing, that I ſuffer ſome pain, or that I am affected with ſome particular ſenſation; for example, joy, ſadneſs, or anger.

XX. That every individual feels this experimental evidence in ſome particular inſtances, no one can doubt, and even if any perſon, by giving to his ſcepticiſm all imaginable extenſion, ſhould be deſirous of doubting of every thing, he could never ſtifle the experimental evidence that he doubted. And here I can't help remarking, that experimental evidence is a thing of ſuch moment to the Carteſians, that all their metaphyſical teſtimonies depend on, or are derived from it; becauſe, from that firſt maxim or propoſition, I think, is inferred immediately, the proof of their own exiſtence; and mediately, all the other demonſtrable truths, are eſtabliſhed upon experimental evidence only.

XXII. It is alſo certain, that from the truths which are eſtabliſhed upon experimental evidence, you can deduce no demonſtrative reaſon-

ing; or at leaſt of that ſort, which the logicians call *à priori*. The reaſon is, becauſe they are evident of themſelves, or elſe are ſupported by immediate evidence, and are not dependant upon any other thing from whence they are inferred. Therefore, although for example, I at preſent am convinced that I am deſirous of eating ſuch or ſuch a thing, I cannot perſuade any other perſon that I fancy it, by any immediate demonſtration; becauſe this is evident to me, not from any principle that is notorious to all mankind, and from whence may be inferred the exiſtence of ſuch a deſire; but becauſe the appetite itſelf, is intimately connected with my ſpirit, and I feel it ſo forcibly, that I cannot doubt of its exiſtence: the ſame thing happens in the caſes of thoſe truths, which are eſtabliſhed upon immediate metaphyſical evidence. If I ſhould be aſked, how I know that the whole is greater than one of its parts, I ſhould anſwer, that I do not know it from any principle from whence it may be inferred, but becauſe the truth, *that the whole is larger than a part*, is ſo clearly evident to my mind, that it is as incompatible with doubt, as the light of the ſun with midnight darkneſs. If any one ſhould deny to me, the truth of the maxim, that two contradictory propoſitions cannot be both true at the ſame time, it would be impoſſible for me

to prove the truth of the maxim, either by arguments deduced *à priori*, or *à posteriori*. The reason is plain, because if I was to argue the point, the most I could do, would be insisting on the manifest contradiction, and asserting the impossibility of the thing, which is the last resource of logical dialect. But observe, when we are got thus far, my adversary, to act consistently with his first caprice, thinks fit to change his ground, and to admit both extremes of the contradiction, and to insist they are both true. Now how, in this case, am I to prove that they cannot be so? Why I can do it by no other means, than by having recourse to the axiom, that it is impossible two contradictory propositions can be both true at the same time. But this is begging the question from the beginning, and proving what is denied, by the same proposition which is the subject of the dispute.

XXIII. The suppositions we have just made, contain all the solutions we are capable of giving, to the above argument. I say then, that I myself, and I say the same of all others, who are in my present situation and circumstances, have experimental Evidence that I am now awake: because the state of wakefulness, which consists, in the intimate and ultimate disposition of the faculties to exercise themselves in proper operations, is an object,

object, which presents itself to my mind, with such clearness, that if I was never so desirous of doing it, I cannot entertain a doubt of my being at present in that state; nor can any other reason be required of me, nor can I give any other, for assenting to this truth; neither can I for my assent to a first principle, give any other than the beforementioned, nor alledge any other, to explain the existence of any reflection, which my soul is at present intent upon.

XXIV. I will not however dissemble, that after this answer is given, there still remains a serious difficulty to surmount, which may be stated in the following manner. The experimental evidence, from whence we deduce this persuasion, is fallacious; because when we sleep and dream, we are under the same persuasion that we are awake, and our senses then represent to us, that we are engaged in actual exercises in such a manner, that if it was at that time to occur to us, to make reflection upon what we were doing, we should conceive, that we had experimental evidence of our speaking, seeing, hearing, &c. Therefore the idea that I now entertain upon reflection, that I have at present experimental evidence of my being at this instant awake, and engaged in study and writing, affords me no absolute certainty that I am not asleep, or that I am actually so employed.

XXV. This is the utmoſt extent to which the matter of doubting can be carried. But by way of anſwer to it, I ſhall reply, that the perſuaſion we have of being awake when we are dreaming, differs greatly from that we have of being awake, when we actually are ſo. This laſt is a clear, firm, determined, invincible perſuaſion, and ſuch a one, as is required to conſtitute experimental evidence of the certainty of the fact; which it does in ſuch a manner, that notwithſtanding all the reflections we can make, and all the doubts and difficulties we can ſuggeſt, our aſſent to, and perſuaſion of the truth of it, remains firm and unſhaken. On the contrary, when we are dreaming, our reflection is obſcure, and the perſuaſion produced in conſequence of it, feeble and wavering; which will evidently appear to be the caſe, if in the courſe of our dreaming, it ſhould occur to us to make a doubtful reflection, whether what our imagination repreſents to us is reality, or only a dream; and the reſult to a man who was to do this would be, a faint and doubtful determination of whether he actually dreams, or only believes he is dreaming, and he would remain in a ſtate of doubt, whether what his fancy repreſents to him be real or not. I ſay in all theſe caſes, his deciſion of the matter, would not be reſolute and firm, but wavering and languid. This doubt of whether

I am

I am asleep or not, often occurs to me in dreams, which never fails to produce one of the two following effects, either to certify to me that I am dreaming, or to make me suspend my assent to the fact. And I will venture to assure any one, who shall persist for a few moments, in proposing these doubts to himself when he is dreaming, that he will find the same thing happen to him.

XXV. We may make use of the same reasoning, if the argument is applied to the deliriums of maniacs. Every man, who after having been deprived of his reason, comes to be restored to his senses, finds a great difference with respect to the persuasions he feels, and the clearness of the opinions he forms in a state of sanity, and those he entertained when he was mad. Mad people seldom make any reflections, either on the state of their mind, or the subject of their madness; and when they do happen to make them, are generally more or less blinded by their apprehensions; of which I myself have known some instances; and it has fallen in my way, by the force of lively representations, first to prevail on some mad people to doubt of the truth of their apprehensions, and afterwards to reason them out of them; among whom there was a nun, who had been exceedingly mad for some

ſome years, and whoſe life was thought to be in danger, although in reality it was not ſo; and I being called to adminiſter the ſacraments to her, was ſo happy as to reduce her mind to a ſtate of calmneſs, that rendered her capable of receiving them as a penitent. This I accompliſhed, by uſing various reaſonings and arguments, tending to undeceive her, and at laſt was ſo fortunate as to hit upon one, adapted to the nature of her diſeaſe, and the ſtate of her mind, which had its effect: but in doing this, great attention ſhould be had to the tone of the voice, and the energy and vivacity of the looks, and care ſhould be taken, that every action ſhould be ſuch, as is likely to give efficacy and force to the arguments you uſe, in order that they ſhould make an impreſſion on their minds; great caution ſhould alſo be uſed not to irritate them; and by theſe means, they are often brought to intervals of ſenſe; and although it is true, that they ſeldom laſt long, ſtill the gaining an hour of calm reaſon, is a matter of great importance, as it was in the caſe of the nun we have juſt mentioned.

XXVII. The delicacy and curioſity of this ſubject, has cauſed me to dwell on it longer than was neceſſary; for I am ſo far from apprehending, that the arguments which are uſed in ſupport

port of univerſal ſcepticiſm, will prevail with, or have any weight on the world in general, that I do not believe there ever yet was a man, who in reality was convinced by them.

SECT. VI.

XXVIII. The limitations with which rigid ſcepticiſm may be mitigated, are innumerable; conſequently, ſcepticiſm will appear more or leſs abſurd, according to the various exceptions with which it is corrected; but this is a matter of ſuch extent, that to reaſon upon it with any degree of preciſion would fill a large volume. I ſhall therefore proceed to treat of ſcepticiſm, as confined within the line of phyſics, which is the point, to which I propoſed at firſt to reſtrain my arguments on this ſubject.

SECT. VII.

XXIX. I have always wondered, and do not yet ceaſe to wonder, at ſeeing modern philoſophers attack ſcepticiſm as a phyſical error, and am much aſtoniſhed, to find them condemn it in that ſenſe as an error, dangerous to the dogmas of faith. Nor can I comprehend, how ſuch a charge

charge can arise, otherwise, than from gross ignorance or malicious spite; unless it is applied to some sceptic, who from explaining himself loosely, may have given occasion for such an imputation.

XXX. The system of physical scepticism, asserts, that physical and natural things, do not admit of demonstration or scientific certainty, but that they are all matter of opinion; and consequently, that we should not call natural philosophy a science, because strictly speaking it is not one, but rather a habit, or acquired facility, of reasoning with probability upon natural things. We shall understand science in this place, in the sense which Aristotle and the schoolmen understand it, who define it, *to be an evident knowledge of the effect by the cause.* But in our definitions, we shall not exclude experimental certainty, or certain knowledge, acquired by the experience we have had, and the observations we have made, of physical matters; but we shall rather maintain it, as the only method by which we can arrive at attaining truth; although I doubt whether we shall ever attain by it, a discovery of the internal, or intimate nature of things.

XXXI. Neither will we deny, that with respect to physical objects, many propositions may be advanced or supported, which are deducible with

with infallible certainty from metaphyſical principles: as for example from this, *the whole is greater than its part*, is evidently inferred, that a man is bigger than his head; and from this, *being is the effect of operation*, is inferred, that my father exiſted when he begot me. But theſe, and other innumerable demonſtrations of this ſort, afford no phyſical knowledge whatever; becauſe they do not manifeſt in any degree, either great or ſmall, the nature of the very entities which are the objects of them. Why do I ſay manifeſt the nature of the entities? They do not even diſplay to the underſtanding, a ſingle truth, which may not be comprehended without their help, by the moſt ruſtic man upon earth. So that the ſyllogiſtical concluſions upon infallible truths, which the ſchool philoſophers ſo much boaſt of, do nothing more, than explain by circumlocution and in terms of art, the very things, which may be immediately comprehended, and naturally explained, by any rational man who never ſtudied. Further, how can they call by the name of demonſtrations, things which demonſtrate nothing? that is, they manifeſt nothing, but what was manifeſt without their aſſiſtance. A logician will ſay, thinking he ſays ſomething to the purpoſe, that he knows by means of the art of demonſtration, that which he could not know artificially without this aid.

But

But I anſwer, that this artificial knowledge is totally uſeleſs, becauſe it neither manifeſts to me any one truth of which I was before ignorant, nor does it illuſtrate to me with greater clearneſs, the things I was before acquainted with; it being certain, that it is as evident and clear to the ruſtic, and that he aſſents with as much firmneſs, that the whole tree is bigger than one of its branches, without the help of artificial logic, as I do, aſſiſted with my whole armory of ſyllogiſms. If a learned perſon, ſhould undertake to inſtruct a man who walks well, and with a good grace, by explaining to him all the laws of motion, to ſtep ſcientifically; and alſo, by explaining to him the number and uſe of the muſcles, ſhould teach him the application of thoſe laws to every member of his body concerned in that exerciſe; ſhould not we be apt to ſay, that beſides his taking a very tedious one, he had alſo taken a very needleſs trouble, it being certain, that his pupil, after all this pains, would not walk a jot better, if ſo well as he did before; the caſes are ſimilar.

SECT. VIII.

XXXII. The thing then being underſtood, in the ſenſe we have explained it, the concluſion I draw

I draw from the premiſes is, that ſcience, or ſcientific certainty is not to be found in phyſics. Doctor Martinez, in the ſecond volume of his *Medicina Sceptica*, (Converſ. 27.) proves this concluſion abundantly, both by the authority of ſcripture, and by the ſentences of many fathers; though as the works of this author are eaſily to be met with, I ſhall not here inſert the authorities he quotes, but ſhall content myſelf with adding to them two very remarkable ones that he has omitted. The firſt is, that of my father St. Bernard (in Cant. Cantic. Serm. XXXIII.), who when he is ſpeaking of philoſophers, ſays, *Vagi ſunt, nulla ſtabiles certitudine veritatis, ſemper diſcentes, et nunquam ad ſcientiam veritatis pervenientes.* And it is ſomewhat remarkable, that the Saint ſays further, philoſophers never arrive at attaining a certain knowledge of the very truths they themſelves are in ſearch of, and are deſirous of teaching to other people: *ſemper diſcentes*; and leſt ſome ſhould conclude he ſpoke of ſupernatural truths, I thought it neceſſary to hint here, that theſe are not the objects of philoſophical inquiries. Neither ſhould we ſuppoſe, that he ſpoke of the moral philoſophers, becauſe many of theſe, even including the Gentiles, inveſtigated many truths, that came within the compaſs of their plan, with intire certainty; and it is evident, that if Ariſtotle, had written with as much preciſion

upon phyſics, as he did upon ethics, we needed not to have wiſhed for any thing better.

XXXIII. The ſecond authority, is that of Lactantius Firmianus, an illuſtrious perſon, and a venerable member of the church; this great man (Lib. III. Divin. Inſtit. Cap. iv. v. and vi.) treats largely of the ſcepticiſm of Archeſilaus, of whom we have ſpoken before, and after combating and confronting this philoſopher effectually on the ſubject of univerſal doubt, admits without reſerve, that he would have been right, if he had limited his ſcepticiſm to matters of phyſics, becauſe there is not, nor ever can be any ſcience, which will teach mankind, the cauſes and reaſons of natural things: *Quanto faceret ſapientius, ac verius, ſi exceptione facta diceret cauſas, rationeſque duntaxat rerum cæleſtium, ſeu naturalium, quia ſunt abditæ, nec ſciri poſſe, quia nullus doceat, nec quæri opportere, quia inveniri quærendo non poſſunt.*

XXXIV. Some of the ſceptics themſelves prove our concluſion, for they ſay, that the things appertaining to phyſics are ſingular, and that from ſingular things you cannot derive a ſcience. But this reaſon does not ſatisfy me. In the firſt place, notwithſtanding phyſical things are for the moſt part ſingular, they in ſome inſtances may ceaſe

ceaſe to be ſingular. Thus, although every real entity is ſingular, it may, contemplated metaphyſically, depart from its ſingularity. In fact, the ſchoolmen together with St. Thomas ſay, that phyſics may depart or be ſeparated from their ſingular, but not from their ſenſible nature; and that mathematical things, may depart or be ſeparated from their ſingular and ſenſible, but not from their intelligible nature; alſo, that metaphyſical ones, may depart or be ſeparated from their ſingular, ſenſible, and intelligible. In the next place, the axiom that from ſingular things you can derive no ſcience, ſhould be underſtood with ſome grains of allowance; that is, of ſuch ſingular things as are particularly neceſſary to the individual, and are accidental to the ſpecies; but from thoſe which appertain or belong to the ſpecies, ſcience may be deduced, even when they are connected with the individual. For example. If I know ſcientifically; that man according to the general received opinion reſpecting him, is riſible, I alſo know ſcientifically that Peter is riſible, for in the following ſyllogiſm; *every man is riſible*; *Peter is a man*; *and therefore Peter is riſible*, is implied the truth of the premiſes, and the conſequence deducible from it is, that it is ſcientifically evident. Further, if ever a philoſopher ſhould ariſe, who ſhould know with certainty, the ſpecific nature

of all material entities, and from that knowledge, ſhould be able to demonſtrate all their properties, and the reſpective operations appertaining to each ſpecies, and in virtue of this extraordinary penetration, ſhould be capable of giving reaſons *à priori* for all the phenomena of nature, we ſhould not be able to deny, that ſuch a philoſopher poſſeſſed phyſical ſcience, notwithſtanding the object of his ſcience, related only to the ſpecies, unconnected with individuals. What then remains to be proved, is, that in phyſics there is to be found no ſort of ſcience, or evident knowledge of the matters appertaining merely to phyſics, abſtracted from all other conſiderations; and truly the dogmatic naturaliſts, would be very happy, could they be permitted to poſſeſs a knowledge that amounts to as much as this; nor would it diſturb them, to have it dinned in their ears, that the knowledge of common conceptions is metaphyſical, and not phyſical; for they would tell you, that both phyſics, and metaphyſics, may depart or be ſeparated from their ſingularity, and that the principal diſtinction between them is, that the laſt regards its object with a greater degree of abſtraction; that is, as exempt from all matter, and conſiders only thoſe reaſons, which may ſubſiſt abſtracted from matter, ſuch as ſpiritual entities; on the contrary, phyſics only contemplate material and corporeal entities; the moſt ſublime of

which conceptions, is that which regards the reaſon of the body, and the loweſt, that which is attached to the corporeal part of it. But call this knowledge by what ſort of name you will, either phyſical or metaphyſical, the way to bring the matter to a ſhort iſſue is, to ſhew that there is not in reality, any ſuch knowledge.

XXXV. And what is more eaſy to be proved than this? I reaſon thus; phyſics contemplate the nature of an entity that has motion, or circulation; this may be conſidered, either according to the ſpecific, or generative nature of the thing; and I aſſert, that nothing is known with certainty of the nature of any entity that has motion or circulation, either in one or the other of the before named ſenſes.

XXXVI. And to begin with the ſpecific, who can deny that in this ſenſe, we know nothing of any one entity? I defy all the philoſophers to tell me what is the conſtituent or component phyſical ſubſtance, of any one of the material entities that is to be found in the univerſe, and will give them leave to chuſe that which they have moſt examined. St. Baſil has ſome words (Epiſt. 168. *ad Eunomium*) that are admirably applicable to this purpoſe, and which I ſhall here inſert: *Itaque qui ſe exiſtentium ſcientiam aſſe-*

quutum esse gloriatur, exponat nobis quomodo, quod minimum esse eorum, quæ in lucem prodierunt, natura habeat. Let the presumptuous philosopher, who boasts of his physical knowledge, explain to us the nature of the least entity which God has created. Let him, adds the same Father, who is ostentatiously vain of having penetrated into the secrets of nature, tell us what is the nature of an ant: *Dicat formicarum nobis naturam, qui eorum, quæ in natura sunt scientiam cum fastu se prædicat assequutum.* But why should we waste time? There is not, nor ever was to this day, any one, who by means of acquired science, could penetrate the constituent or component physical substance of any living or inanimate entity; the reach of our capacities not permiting us to go further, than to distinguish by some very extrinsic accidents, one thing from another; and this mode of distinguishing, is confined principally to those we call naturalists, and rarely extends to those in the schools, who acquire the appellation of philosophers, and who generally content themselves with distinguishing some few, which they commonly do in the unhappy manner we shall proceed to point out; but when school philosophers descend to treat of specific conceptions, their philosophy is so miserable and confined, that they only attempt to give the colour of a definition to a few species of

of brutes, whoſe voice they deſcribe by ſome particular name, and then explain their conception of them, by ſome term derived from that name; thus they call the lion a roaring animal; the dog a barking one, and the horſe a neighing one; but the fiſh, becauſe they are very numerous, and are for the moſt part mute, cannot well be comprehended within this rule, and therefore are obliged to go without a definition.

XXXVII. The ſchool philoſophers cannot be ignorant, that theſe are not definitions, but ſhould rather be termed mere ſhadows of definitions, which they make uſe of for want of true ones, to expreſs logically, what definition is, what ſpecies, what gender, what difference, and other things appertaining to logical dialect; but is it not clear, that defining a horſe by calling him a neighing animal, can give us no better conception of the creature, than may be conveyed to us by the moſt ſtupid clown, who would explain the thing more ſimply, and without ſchool jargon, by telling us that a horſe *is an animal that neighs, or is capable of neighing?* Oh! what a penetrating philoſophical deſcription is this of the nature of a horſe!

XXXVIII. If any one, notwithſtanding what has been ſaid, ſhould chuſe to reply, that nature,

as the root of all operations, ſhould be explained according to the order, or habit of thoſe operations; and thus, that a horſe is well and phyſically defined, by the radical order of the act of neighing; if any one, I ſay, ſhould reply to me in this manner; I appriſe him in the firſt place, that all ſubſtantial nature has its abſolute being, which is underſtood to be antecedent to the order of operations, for the firſt, is ſuppoſed to be the cauſe or reaſon of the other; that is to ſay, becauſe ſuch a thing has ſuch a being in nature, from thence is derived the habit or aptneſs for ſuch operations. I appriſe him ſecondly, that if we ſhould permit nature to be well defined by the preciſe or characteriſtic order of operation, this ſhould not be extended to every ſort of operation, but ſhould be confined to the primary operation, which marks the foundation of the ſpecies; but alas, we are ignorant of what that is. For example, if a man, as is generally thought, is well defined by his rational faculty, or radical power of reaſoning; becauſe the being able to reaſon or reflect, is the principal, or primary operation of man; a horſe then ſhould be defined by his radical habit to that act of perception, inſtinct, or knowledge, which is proper to his ſpecies, and diſtinct from that of all other animals. But who has penetrated what this is? Or who has ever known the innate difference, that

that there is between the inſtinct of a horſe and a dog? And thus, as it would be ridiculous and abſurd to define a man by the radical order of elocution, by ſaying, that he is an animal who can talk and diſcourſe; becauſe this abſurdity would be incurred, on account of the act of elocution being poſterior, or ſecondary to that of reaſon or reflexion; and it would be much more ridiculous, to define him by the order of his voice, which you deſcribe by ſome particular name, and to define him in the manner you define a horſe, which you call a neighing animal; nor is it leſs abſurd to define a horſe by the radical order of his neighing. I appriſe him thirdly, that if ſuch definitions are admitted as good and legitimate, it is the moſt eaſy thing in the world, to define every ſubſtantial entity whatever, becauſe in order to do it, you have only to obſerve its operations, give the moſt remarkable one a name, and define it by that name. By the help of this inſtruction only, you may make every peaſant a conſummate philoſopher, and enable him to define the nature of all the entities in the univerſe.

SECT. IX.

XXXIX. Theſe reflexions anſwer no other purpoſe, than that of confronting here and there a ſuperficial and baſtard ſchoolman, for all capable

pable people know and confeſs, that we are unable to give a definition of any one ſubſtantial entity, except man. To what ſtraight limits then is our philoſophy confined!

XL. But the misfortune is, that we have no certainty, that the general received definition of a man, to wit, that he is a *rational animal*, is a good and unexceptionable one; for we are clear it would not be a good one, if this faculty appertains to other animals as well as him, and it is matter of doubt whether it does or not; but I will not, nor cannot, in ſupport of this doubt, avail myſelf of the authority of Porphyrus, who in his Treatiſe on Predicables, ſuppoſes God to be a rational animal; and in order to diſtinguiſh between God and man, defines man to be a mortal rational animal, becauſe he thought that without the addition of the word mortal, the definition would be applicable to God as well as man. Neither will I avail myſelf of the authority of Ariſtotle, from whoſe ſecond book, De Sect. Pythagora, Jamblicus cites theſe words: *Animalis rationalis aliud quidem eſt Deus, aliud autem homo.* But I may for this purpoſe, avail myſelf of the authority of ſome Fathers, among whom is St. Auſtin, who all affirm, that the angels are corporeal, or at leaſt have doubted of their incorporeality; to which doubt, appertains that,

that, of whether angels are rational animals, for in order to ſuppoſe them ſo, there wants nothing but their being corporeal, and conſequently it is doubtful, whether the definition of rational animal, appertains ſolely to man.

XLI. I may be told, that the corporeality of Angels has been condemned, and their incorporeality defined, in the ſecond Council of Nice, and the fourth Lateran one. But in the firſt place, is it certain, that theſe Councils declared the incorporeality of angels to be undeniable, and that they declared affirming the contrary is erroneous; for it is ſomewhat doubtful, whether the incorporeality was defined in them or not; becauſe, although mention was made in theſe Councils of this matter, it was not done with an expreſs deſign to diſcuſs the point, but was only touched upon, as we may ſay by *incidence*; which is an exception that all eminent theologians admit, to our being bound to obſerve things that are canvaſſed in that way even in Councils; as we are not obliged to ſuppoſe any matters defined in them, that are not debated and ſettled with an expreſs intention. For which reaſon, the moſt learned Cano *(lib. 5. de Conſiderat.)* took the liberty of ſaying, that the opinion that angels were corporeal, although it might be falſe, was not heretical; and long before him, St. Thomas in his book

book *de Malo, (quæſt.* 16. *art.* 1.*)* had ſaid, that this queſtion was no part of the Catholic Dogmas. My father Saint Bernard *(lib.* 5. *de Conſiderat.)* goes further; for he ſeems to think, the opinion which denies the corporeality of angels, to be void of probability; and it will not be improper to remark here, that he was much poſterior to the ſecond Council of Nice, and Saint Thomas, not only to the ſecond Council of Nice, but to the fourth Lateran one alſo. This may likewiſe be alledged as an anſwer, to the objections that are made in conſequence of ſome texts of Scripture, which give the epithet of ſpirits to the angels; for it is certain, that the fathers who conſidered it as defenſible to maintain the corporeality of angels, were not ignorant of thoſe texts; the expoſition of which, in truth is not difficult, for we may fairly conclude, the Scripture calls them by this name, on account of their being airy or light bodies, and we may alſo ſuppoſe, that it is for this reaſon, that in various places it gives the name of ſpirit to the air. *Spiritus procellarum. Advenientis ſpiritus vehementis, &c.*

XLII. The ſecond reply I ſhall make, is, that ſuppoſing it to be determined that the angels are incorporeal, this truth is not eſtabliſhed by philoſophy,

philoſophy, but by faith; and as upon the knowledge of this truth, depends the certainty, that the definition of a rational animal does not belong to an angel; it follows, that by the help of philoſophy alone, we ſhould never have hit upon giving a definition of a man; and with reſpect to defining other things beſides a man, its inſufficiency is admitted. What ſort of philoſophy is this? It ought rather to be called a total want of philoſophy.

XLIII. Not only with regard to the angels, but on the part of brutes alſo, we find motives for doubting, whether the definition of *rational animal*, may not be applied to them as well as to man. If *rational animal* ſignifies an animal capable of reflexion, the brutes are rational animals in the opinion of all thoſe, who ſuppoſe them to be endowed with reaſon and reflexion: and as this ſentiment may be ſupported by ſtrong arguments, it remains ſomewhat doubtful, whether rationality is not diffuſed in different proportions to other animals as well as men, or whether it is confined to them only. It is true, that if this opinion ſhould be admitted, we ſhould grant, that the reaſon of man is diſtinct from, and of a ſuperior nature to that of brutes; but if in the definition, we do not point out the character which diſtinguiſhes them,

we

we are reduced to assign as the difference, a generical idea.

SECT. X.

XLIV. As we ascend the predicamental tree, and advance from the species, to the genuses or kinds; we perceive, that philosophy does not discern these more clearly, than it did the others; for we find in both cases, equal ignorance, and equal uncertainty. If we ought to have scientific certainty of any one genus in preference to another, it should be of that under which we ourselves are comprehended, which is the animal kind, for that is the thing which most immediately relates to us, and because also, we employ more consideration and attention upon that, than we do upon the others. We call the order animal, which comprehends man, and every other species of terrestrial and aquatic brutes, as likewise every kind of fish or fowl. And what do we know of animals according to this general description? Why that that they are *sensitive living beings*; for that is the definition we give of them. But do we know this with any degree of certainty? By no means; for it has been doubted whether every animal is sensitive; and it has also been doubted,

doubted, whether the ſenſe of feeling does not belong to other entities as well as to animals.

XV. The firſt doubt is built upon the oppoſition and arguments of the Carteſians, who pretend, that all brutes are inanimate machines, and that there is no other ſenſible animal but man; for which reaſon, in their opinion, a ſenſible being is not a generical entity, but a ſpecific one, and proper to the human ſpecies in a quarter proportion. I am thoroughly perſuaded, that this opinion of the Carteſians is a falſe one; but I have not yet ſeen any evident argument or demonſtration to confront it; nor has any perſon hitherto, hit upon one that evinces the falſity of it; for their principal foundation is not ſo weak, but that it has puzzled the moſt able Ariſtotelites to give an anſwer to it. But I do not find, that this is any obſtacle to our giving our firm aſſent to the ſenſibility of brutes; although we have no reaſon to glory in our proofs of this matter, when the contrary opinion, beſides the arguments that are produced to ſupport it, finds ſo many partizans; and among them ſome of excellent ingenuity. Nor have we any reaſon to ſuppoſe, what I have known many people maintain, that all the Carteſians, think differently from what they ſpeak in this matter; for ſome of

of them, are as full of the caprice that brutes are inſenſible, as we are of the perſuaſion that the contrary is the fact. A few years ago, certain ladies who were preſent at a bull-feaſt, ſeemed to expreſs great concern for the ſufferings of one of the bulls, which the people employed for that purpoſe, worried exceſſively. A French lady, who was a Carteſian philoſopher, that ſat near them, begged they would not grieve, for ſays the good Carteſian with great gravity, *I believe as firmly as I do in God and this croſs, that the bull feels no more pain than the bench I ſit on.* I do not know whether the other ladies believed her, but I am perſuaded, that many are ſtedfaſtly of the ſame opinion with the French lady.

XLVI. The ſecond doubt, whether other entities beſides animals are not ſenſible, is patronized by Campanela, who labours by a variety of arguments, to prove in divers parts of his Works, that all elemental things are ſenſible. This doubt is alſo ſupported, and with more colour of reaſon, by thoſe philoſophers, who allow feeling to plants. And that this opinion may not appear extravagant; for the information of thoſe who adopt the common ſentiment, it will not be amiſs to let them know, that Ariſtotle did not look upon this thing in that

that light, for he rather inclines to patronize the doubt; for in his firſt book *de Plantis*, he ſays, there is no certainty whether plants are, or are not, endued with feeling, appetite, and knowledge: *Nec enim conſtat, habeant ne plantæ animam, appetendique facultatem, doloris item, & voluptatis, & rerum diſcretionis.* In the third place, the naturaliſts, who build upon experimental obſervations, attribute feeling to ſome determined ſpecies of plants, which on that account, they call ſenſitive plants.

SECT. XI.

XLVII. If of our own proper genus, we know nothing with certainty, what muſt our knowledge be of others? The genus moſt immediately next to our own, is that of plants, and in this, notwithſtanding our proximity, we can diſcern nothing but our ignorance; for we cannot venture even by conjectures, to point out the conſtitutive difference between them. This is not only inviſible to the eyes of evidence, but impalpable to the eſſays of opinion. We commonly define the genus of a plant, by the term inſenſible living entity. But the word inſenſible, which we uſe to deſcribe the difference, only ſignifies want of ſenſibility; and a poſitive

entity, ſuch as a plant is, cannot be aſcertained by a negative. Beſides this, as we obſerved before, it is ſomewhat doubtful, whether plants are, or are not ſenſible. We call them alſo *living vegetables*. But by this idea, we do not aſſign to the plant a different nature from the animal, for that this alſo is a living vegetable. If I am told, that the difference conſiſts, in that the life of the animal is vegetative and ſenſitive, and that that of the plant is purely vegetative, I reply, that the adverb *purely* in this place, ſignifies nothing but the want of ſenſitive life, which is meant to be expreſſed in the extreme, and a want, cannot be made uſe of as a deſcriptive term, to point out the conſtitutive difference between poſitive entities. Nor will it be of any uſe to anſwer, that the term want, means a want or defect in the mode of explanation, and does not apply to the thing ſignified; for till it can be aſcertained what the thing ſignified is, we muſt remain totally in the dark; and it is alſo falſe, that this term *want*, is not applicable to the thing ſignified; for negative expreſſions are poſitive with reſpect to the thing ſignified, when they are uſed to deny any imperfection in the object they relate to; for the want of an imperfection, is the want of a want, it being certain, that all imperfection conſiſts in the want of poſitive perfection; for which reaſons

reaſons theſe words, infinity, immenſity, indiviſibility, although negative with reſpect to the mode of expreſſion, are poſitive with reſpect to the thing ſignified; but the term inſenſible, or inſenſibility, applied to a plant, ſignifies want of perfection, and thus is negative with reſpect to the thing ſignified.

XLVIII. Beſides this, ſome expreſs a doubt, whether plants are vegetable or not; and ſome are alſo doubtful, whether the property of vegetation does not likewiſe belong to ſtones and metals. If we conſult the Carteſians upon this point, they will tell us, that all we call vegetation or nutrition of plants, is pure mechaniſm, aud that the attraction of the nutritious juice which we attribute to them, is a ſolemn chimera. If we forſake the Carteſians, and apply to the experimental philoſophers, we ſhall find many of them, who will tell us, that metals and ſtones grow by means of vegetation; which is an opinion, that not long ago, was illuſtrated by Joſeph Pitton de Tournfort, a celebrated naturaliſt of the Academy Royal of Sciences at Paris, and more eſpecially, by the celebrated obſervations he made upon marble in the wonderful cave of Antiparos; and with reſpect to metals, we, to the authority of others, ſhall add that of Ariſtotle, who in his book *de Mirabilibus Auſcultationibus*, ſays, that

in a territory of the iſland of Cyprus, they were uſed to ſow iron, and that it grew and vegetated like other plants.

XLIX. And now we are ſpeaking of Ariſtotle, we will not omit mentioning an authority of his, which is very applicable to our preſent ſubject, becauſe it is totally oppoſite to a received opinion in the ſchools, to wit, that plants and animals are of two different genuſes, and that the diſtinction between them is, that the animal is a living ſenſible entity, and the plant a living inſenſible one. Ariſtotle in his book *de Plantis* ſays, that oyſters and other ſhell-fiſh, are both plants and animals: *ſcimus autem, quod conchyla animalia ſunt cognitione carentia: quapropter plantæ ſunt, & animalia.* I aſk now, how one ſpecies can be claſſed under two diametrically oppoſite genuſes? and how an oyſter can be both ſenſible and inſenſible? for as an animal, it ought to be a living ſenſible entity, and as a plant, a living inſenſible one. Nor can it be ſaid, that Ariſtotle, when he called an oyſter a plant, ſpoke in a metaphorical ſenſe, for this mode of ſpeaking is not allowed to philoſophers, but is only permitted to poets and orators. Beſides, the cauſe he aſſigns, ſhews, that he ſpoke in a rigorous philoſophical ſenſe; although, to ſpeak the

the truth, I do not comprehend who could reveal to Ariſtotle, that oyſters and other ſhell-fiſh are deſtitute of that ſort of knowledge, which is proper and natural to the moſt ſtupid brutes.

SECT. XII.

L. From the loweſt ſpecies, we proceed to the next above, and enquire, what is the nature of a living entity; what we are to underſtand by the term living, and what is life? To this, we ſhall be anſwered from the ſchools, that life is motion *ab intrinſico*, and that living, means that which moves *ab intrinſico*; that is, its motion is produced by ſome intrinſic faculty, or virtue, which it has within itſelf.

LI. This definition is incumbered with greater difficulties than the antecedent ones. All the modern philoſophers oppoſe it, although for diſtinct and contrary reaſons. Gaſſendo, father Maignan, and the other atomiſts, attribute motion *ab intrinſico* to atoms, from which dogma it will follow, that motion *ab intrinſico*, is not diſtinctly peculiar to living animals. The Carteſians are very poſitive in maintaining, that nothing can give motion to itſelf, but that all motion in the univerſe, proceeds from that

impulſe, which God in the beginning gave to matter, which does, and ever will ſubſiſt, without being impaired or injured; and that by virtue of that impulſe, motion is communicated from one part of matter to another; ſo that all which was before at reſt, upon its beginning to move, received its impulſe from ſome other body which was in motion before, and transferred its influence to that which was then at reſt; and either partly, or in the whole, gave it the power of beginning to move; and they ſay further, that man, which is the only living corporeal entity they admit, when he moves, cannot be properly ſaid to give motion to his members, but only directs their motion by his will, in virtue of the power antecedently impreſſed by the impulſe of other bodies on the animal ſpirits.

LII. It cannot be denied, that this doctrine is terribly fortified, by the celebrated maxim of Ariſtotle, which ſays, *that every thing that moves, is ſet in motion by ſomething elſe:* and although the followers of the common opinion, explain this maxim, ſo as to render it not incompatible with the definition they give of living entities, there reſults from this explanation, the inconvenience, that it weakens the principal force of the axiom which they avail themſelves

themſelves of to prove the exiſtence of a firſt mover, to ſtimulate a body at reſt; for if we ſuppoſe, that a living entity has the power of moving itſelf, we cannot maintain the neceſſity of a divine influence to produce this motion, without admitting at the ſame time, the exiſtence of a firſt mover in other reſpects, to be eſtabliſhed. Thus it ſeems to me, that the Carteſians can with ſome colour of reaſon pretend, that religion is intereſted in underſtanding the axiom in all the rigour, which they profeſs to underſtand it themſelves.

LIII. But be it as it may, with reſpect to this difficulty, and all others, which the moderns by virtue of their principles can oppoſe to the doctrine of Ariſtotle; it is certain, that there may be very ſerious ones urged againſt their definition of living entities. Heavy bodies move *ab intrinſico*, and are not living entities. Fire moves *ab intrinſico*, and is not a living entity. The fermentative motion alſo, according to common phyſics, is underſtood to be *ab intrinſico*. And I have remarked and proved in another part of this work, that what the Ariſtotelites ſay of heavy bodies being moved by communicated impulſe, in the form this explanation is intelligible, is alſo applicable to the motion of living entities.

SECT. XIII.

LIV. There now only remains within the compaſs of the predicamental ſcale, one other thing to conſider, which is the higheſt, and moſt ſublime within the reach of phyſics, and that is, the nature and compoſition of the body; but where will this lead us to, the point being equally doubtful with all the reſt? The compoſition of the body, is divided into elemental and mixed; but as this laſt is compoſed of the other, unleſs we know what the elemental is, it is impoſſible to know of what the mixture conſiſts. Very well; but who knows the nature and number of the elements? To this queſtion, methinks I hear four anſwers, from four ſects of philoſophers, which are all different, although each pretends to exclude the others from a competent knowledge of the matter. The Ariſtotelites ſay, that they are air, fire, earth, and water. The chymiſts, that they are ſalt, ſulphur, mercury, earth, and water. The Carteſians inſiſt, that they are compoſed of the ſubtil, the globulous, and another matter which is more groſs, and which they call the third element; and the atomiſts, that they conſiſt of the atoms. Theſe are the opinions, which are at preſent the moſt prevailing, although

although there are numbers of others which I ſhall omit to mention, becauſe they have but few votaries. Now which of theſe opinions is the true one? Perhaps neither. At leaſt there is but one ſect out of the four that admits either of them to be true, and whichever that ſect adheres to, the other three aſſert to be falſe; which amounts to the ſame, as ſaying that one witneſs depoſes to the truth of the matter in queſtion, and that three give teſtimony againſt it. Thus no judge to whom the deciſion is confided, can give ſentence in favour of either of the parties; it being out of his power to affirm, that any one of their ſyſtems is right and true.

LV. As the audience before whom I propound this reflection, is compoſed chiefly of the followers of Ariſtotle, methinks I hear them exclaim, that if we were to collect the ſuffrages of the academic profeſſors, we ſhould find moſt votes in favour of his opinion. To this, I reply in the firſt place, that although a plurality of ſectaries, gives greater extrinſic probability to an opinion, ſtill it does not afford certainty, nor intrinſic probability; and the queſtion here, is not whether Ariſtotle's opinion is the moſt probable, but whether it is certain. I reply ſecondly, that it is doubtful, if we were to include the profeſſors who teach phyſics in all nations, whether we ſhould

ſhould in reality find a majority of votes in favour of Ariſtotle; and unleſs we could prove by ſome authentic inſtrument, that God has limited the knowledge of philoſophy to our nation only, and has excluded all others from inheriting the ſcience, I do not know upon what pretenſion we can ground a right, of admitting none but Spaniards to vote in the queſtion. Some of our antient profeſſors ſay, that we ſhould not regard the opinions of ſtrangers, becauſe they are noveliſts; but at the ſame time, ſtrangers reply, that we ſhould take no account of what the Spaniards aſſert, becauſe they are obſtinate and wrong-headed, and that there is no proof, be it ever ſo clear, that will make them depart from their old opinions; to which they add, that in Spain, they do not follow Ariſtotle from choice, but from neceſſity; for that it requires an heroic ſpirit, to contradict any thing that has been advanced by Ariſtotle in that kingdom, where whoever dares venture to oppoſe him, is inſtantly aſſailed by tempeſts of injuries, which fall on his head like violent hail ſtorms. Nor is even an heroic ſpirit, ſufficient to enable a man to ſupport ſuch an oppoſition, becauſe the duty of obedience, obliges people not to depart from the line of their ſchool; and this is alſo frequently the caſe, in other countries; and from hence, ſome Anti-Ariſtotelites have inſiſted, that the plurality

plurality of votes in favour of Ariſtotle ſhould not prevail, becauſe they cannot be ſuppoſed to be free.

LVI. But abſtracted from the quantum of extrinſic probability, contained in the doctrine of Ariſtotle reſpecting the elements; I aſſert, that upon a ſtrict examination, you will not find more truth contained in his ſentiments, than in thoſe of his adverſaries. This opinion, I deduce from the poſition, that his firſt qualities conſiſt of four, to wit, heat, cold, wet, and dry, from which in exact proportion, he attributes one to be impregnated in the higheſt degree with each element, and another near to the higheſt. This proof, goes lame in innumerable particulars. Firſt, the giving to theſe qualities the title of firſt, is conferring a mere voluntary dignity on them, and eſpecially, when we know the invincible difficulty, that attends eſtabliſhing, that all the others reſult from them. Secondly, it is very doubtful, whether all the four beforementioned, can properly be called qualities; for many Ariſtotelites, and with great colour of reaſon, deny humidity and dryneſs to be ſuch. That which is humid, is not ſo from any quality it poſſeſſes in itſelf, but becauſe it has imbibed into its pores ſome foreign liquid ſubſtance, and let that be evaporated, and it will remain dry; from which

we may conclude, that humidity is a ſubſtance, and that dryneſs conſiſts in the want of that ſubſtance. Thirdly, the appropriating theſe as two of the four elements, is done without any foundation or reaſon. In the next place, how can they prove that water is cold in the higheſt degree? If this was true it would kill us; neither can they prove it ſo, in a more moderate, or ſecondary degree, for we are taught by experience, it is indifferent to both cold and heat, according to the agent that is applied to it. It is heated by the fire; and remove it from the fire, and it becomes cool again, not becauſe it has any propenſity or natural diſpoſition to be cold, but becauſe it is made ſo, by the cool atmoſphere which ſurrounds it. There are many other very grave objections to be urged againſt this doctrine of the four qualities; and therefore the foundation upon which it is built, and the reaſoning deduced from it to eſtabliſh the quaternian ſyſtem of the elements, are both very ſlight and futil.

LVII. The ſecond argument, is built on the correſpondence of the four humours of the body, with the four Ariſtotelic elements; that is to ſay, the blood with the air, the choler with the fire, the melancholy with the earth, and the pituitous with the water. But this puts us in a

worſe ſituation than we were before. In the firſt place, it is a doubt among the medical people, whether the humours of our bodies conſiſt preciſely of four. Some ſay they are more, and others that they are leſs. Some add to the four, the lymph, the pancreatic juice, and the nervous fluid; and ſome again will not admit, that there is any other humour except the blood. Secondly, if the four elements correſpond only with the four humours, we are left without an element to correſpond with the ſolids, which on account of the hardneſs of their ſubſtance, might with more propriety be compared to the earth, than to the melancholy humour, which is beyond compariſon leſs hard and ſolid than the other. Thirdly, in the ſame voluntary manner, with which they aſſign four elements to correſpond with the four humours, they may aſſign one element to correſpond with the fleſh, another with the bones, another with the marrow, another with the fat, or adipoſe ſubſtance, another with the tendons, and ſo on. Fourthly, in order to reaſon juſtly upon the human body, or animal ſpecies, we ſhould not ſeek for four ſubſtances that are analogous to the four humours, but for four that enter into all the mixtures; for the queſtion, relates to elements that partake of the compoſition of all mixtures in general, and not preciſely of the animal. But what traces can we diſcern, of four humours,

humours, or four ſubſtances, equivalent to theſe, either in minerals, or plants?

LVIII. The third argument in ſupport of this quaternian ſyſtem, is pretended to be derived from experience; for it is alledged, that when a piece of wood is burning, we ſee it reſolve itſelf into the four Ariſtotelic elements. At firſt it emits a ſmall portion of water; then it takes fire; the fire is followed by ſmoke, which we know to be of an aerial nature, by its aſcending to the airy region; and laſt of all, there remains a portion of earth in the aſhes.

LIX. Although as Etmuller ſays, in matters of phyſics and medicine, *præſtat unum experimentum centum rationibus*, ſtill, the experiment juſt alledged is ſo defective, that it is not of more value than the arguments before urged. In the firſt place, dry wood, may as properly be called a mixture as green wood, notwithſtanding which, it emits no water upon being laid on the fire. Secondly, as we are here treating of the elements in general which enter into, and make a part of the compoſition of every ſpecies of mixture, the fire ſhould produce the ſame appearances, and have the ſame effect upon them, that it has upon the wood; but this does not happen, for minerals laid on the fire emit no water, unleſs it is when they have imbibed ſome foreign moiſture.

Thirdly,

Thirdly, the chymiſts by means of fire differently applied, extract from wood and other mixtures, various ſubſtances, which differ from thoſe four that are produced from the wood in the ordinary way of burning it; and it ſeems reaſonable from hence, that we ſhould augment the number of the elements. Fourthly, we do not know whether theſe ſubſtances pre-exiſted in the wood, or whether they were produced *de novo* by the fire. Fifthly, the aſh is not earth, nor an elemental or ſimple body as is ſuppoſed, for there may be ſeparated from it a large portion of ſalt, which is a diſtinct ſubſtance from either of the four; for it is neither earth, air, water, or fire. Sixthly, neither is the ſmoke air, as is manifeſt from the ſoot which condenſes in the chimney. If I ſhould be told, that in the ſmoke is contained a variety of particles, ſome of which compoſe the ſoot, which remains in the chimney, and others which mount higher, and are impregnated with the atmoſphere, and become air; I reply, that in conſequence of this, they ſhould admit of a fifth element of ſoot; or to ſpeak more properly, of five or ſix additional elements; for Mr. Boyle informs us, that the chymiſts can extract from ſoot, five or ſix different ſubſtances. Finally, all that becomes aſhes, exiſted before in the form of fire; from whence it follows, that the form of aſhes is a new production, for matter cannot exiſt under two ſubſtantial forms at one and the ſame time;

and

and consequently, the elemental form of earth which the Aristotelites ascribe to the ashes, could not pre-exist in the mixture, but must be a new production. This objection militates principally against the Aristotelic principles; but others might be formed in different shapes, against every system whatever.

LX. I have combated only the Aristotelic opinion of the elements, not because the others are not incumbered with equal difficulties, and exposed to equal objections, but because in Spain, we suppose the others to be perplexing, and even improbable, and conclude that of the four elements, to be just and right; I therefore chose to attack this system, to let my countrymen see, that we know nothing with certainty respecting the elements.

SECT. XIV.

LXI. I have remarked before, that if we are ignorant of what the elemental bodies consist, we cannot possibly know the nature of the mixtures. But even if we could ascertain what the elements are, we should still remain in profound philosophical ignorance with respect to the competent parts, of both them and the mixtures; for admitting the four following, air, fire, water, and earth, to be elements of all the mixtures; who has yet ascertained the nature of those

thoſe four bodies? Ariſtotle only reaſoned upon their qualities, and this he did with ſo little preciſion, that all he ſaid may be looked upon as doubtful, for he had no ſolid principle, from whence he inferred, that they poſſeſſed the properties which he attributed to them; but drew all his concluſions, from an ideal proportion which ſtruck his own imagination; and reſpecting which, it has ſince been proved, that he was miſtaken. He ſays that air is hot, and fire dry in the higheſt degree; but in our eſſay on phyſical paradoxes, we have proved that the air is not hot; and according to Ariſtotle's definition of humidity, we may infer, that a flame is humid, for it cannot be contained within its own bounds, but pervades other regions. We alſo proved in our eſſay on phyſical paradoxes, that elemental fire is not hot in the higheſt degree; and to what I ſaid there, I will add in this place, that experience ſhews us, one fire is hotter than another, and has greater power to heat or melt ſubſtances, either in conſequence of its greater bulk, or on account of the matter with which it is made, or the manner the place is diſpoſed and contrived, in which it is lighted; from all which it may be inferred, that fire in its nature is not hot in the higheſt degree, for if it was, as in every fire the nature of fire is preſerved, every fire would be hot in the higheſt degree, and of courſe, could not be exceeded in heat by another fire.

LXII. Ariſtotle however, did no more than aſſign falſe or uncertain qualities to his four elements, and left untouched, ſubſtantial nature which is the root of them; and thoſe who ſucceeded him in all after-ages, if they aimed at more, attained no more. The ſectaries of Ariſtotle content themſelves with ſaying of the elements, what they ſay of all other natural compoſitions; that is, that they are conſtituted of matter in phyſical forms, are real incompleat entities, and evidently diſtinct from each other. By all which, admitting this deſcription to be right, they teach us nothing, till they explain to us, of what the phyſical form conſiſts, and what is the ſpecific nature of the phyſical form, in every natural compoſition. But their ſyſtem explained in the general way, in which they themſelves define it, is ſtrongly combated by the modern philoſophers, who find an inſurmountable difficulty in the generation of the material forms, not being able to comprehend, how their production can be any thing elſe but a new creation; for the arguments the Ariſtotelites fly to, of deducing them from the power of the matter, contain nothing but words, void of all real ſignification; and truly Ariſtotle himſelf having ſaid, that the form is one of the principles of a natural entity, and that the principles are thoſe things, which are neither made from their own ſubſtance, nor from that

of

of any other entity whatever, ſhew them to be words which have no fixed meaning: *Quæ nec ex ſe, nec ex aliis, ſed ex quibus omnia fiunt*; how then can we reconcile this doctrine, with the form being made of the matter?

SECT. XV.

LXIII. But have the moderns who exclaim ſo much againſt Ariſtotle, hit upon the truth? By no means. They have reaſoned more boldly, but not with better ſucceſs. They tell us, that the texture, collocation, figure, and motion of the particles, produce all the operations of nature, without the neceſſity of having recourſe for this purpoſe, to accidental or ſubſtantial forms; but by ſaying this, they expoſe themſelves to the ſame fault which they reprehend in the Ariſtotelites, which is that of ſpeaking too generally; for as theſe laſt, do not explain or define, of what the ſubſtantial form conſiſts which diſtinguiſhes one entity from another, neither do the others determine, the texture, co-ordination, and figure of the particles which appertain, and are proper to each compoſition; in conſequence of which, they all involve themſelves in innumerable difficulties, which they reciprocally object againſt each other. The Carteſian ſyſtem appears chimerical to the Gaſſendiſts, and the Maignaniſts; and theſe two laſt parties, although

they agree in assigning the Atoms as the principles, and elements of all material things, oppose one another in various particulars, it being a principle with the Maignanists, that the Atoms are different in species, and with the Gassendists, that they differ only in figure; all of which systems, are exposed to be combated by arguments that are terribly strong.

SECT. XVI.

LXIV. From all that has been said, it may be evidently concluded, that we know nothing of the nature of that principal object of physics, *an ens mobile*, either taken as confined to individuals, or considered with respect to the species, or contemplated in an abstracted sense, as relating to the gradations, of lowest, inferior, or supreme. What one sect affirms, another denies, and the worst is, that, attend to the reasoning of which of them you will, you will find the arguments against the system of each, stronger than the proofs in favour of it. On this account, Lactantius said wisely, that philosophers have swords, but no shields: *Gladium habent, scutum non habent.* They produce penetrating arguments wherewith to assail the opinions of their opponents, but not solid solutions, wherewith to defend their own. What can we do then in such a

caſe? Why nothing but ſuſpend our judgment, till ſome angel ſhall decide the conteſt.

LXV. Perhaps ſome one will remark to me, that the ſubſtantial nature of things is at a great diſtance from our view, and that therefore it is not wonderful, that we have not yet penetrated into the inmoſt receſſes of philoſophy; for that without advancing ſo far, we may find ſufficient matter whereon to exerciſe our ſpeculations, in contemplating the ordinary phenomena of nature, and by endeavouring to diſcover their proximate cauſes; which attempt, may poſſibly be crowned with ſucceſs, by obſerving and reaſoning upon every ſpecies of movement which is peformed by an entity, that has motion or circulation, according to the nature of ſuch an entity.

LXVI. I will acknowledge, that philoſophy helps us to reaſon upon natural phenomena, and to enquire into their more immediate cauſes; but in doing this, we frequently wander in the dark, and are much expoſed to be interrupted by impediments, produced by ignorance and doubts; except it is in the caſe of a few truths, the diſcovery of which, we owe to the light of experience; and this fact is evinced, with re-

ſpect to the very inſtance of motion which has been juſt alledged.

LXVII. With regard to the movements of generation, corruption, alteration, augmentation, and the reſt, which are conſidered as diſtinct from local motion, you can find nothing that is not queſtionable, both in the ſchools of the Ariſtotelites, and in thoſe of the modern philoſophers. The very definition of motion in general, which was given by Ariſtotle, ſome reject as obſcure, others as perplexed, and others as nugatory. The movements we are now treating of, in the opinion of Ariſtotle, are acquiſitions of new forms, either ſubſtantial, or accidental; but the Moderns, who deny the exiſtence of all material forms, object to this definition of thoſe movements. Even among the Ariſtotelites themſelves, it is not agreed, whether motion is not influenced by paſſion; nor whether the firſt, is not obedient as a paſſive agent to the laſt. And thus in every thing elſe, it is all queſtion, and all diſpute.

SECT. XVII.

LXVIII. And why ſhould we be ſurprized that with reſpect to theſe movements, which as we may ſay, nature executes behind the curtain,

tain, human underſtanding has made ſo little, or next to no advances? what we ought more to wonder at, is, that it happens the ſame with reſpect to all local motion, which lies ſo plain and open to our obſervation.

LXIX. The motion with which heavy bodies deſcend, is the moſt frequent and common to our view. And what do we know of this? Of its properties very little; of its cauſes nothing. We know it acquires ſome degree of acceleration in its paſſage, becauſe we ſee it; but what is the proportion of the increaſed acceleration, is matter of great debate, both among the philoſophers, and mathematicians. We know that it is a motion of deſcent, but we do not know whether its courſe is directed to the centre, or the axis of the earth. The cauſe of this motion remains ſo hidden, that the philoſophers to this day, have given no opinion concerning it, that I will not venture to pronounce an abſurd one. The Ariſtotelites, by ſaying the cauſe of this motion proceeds from an innate diſpoſition to move in every thing, ſay nothing, unleſs they point out the particular virtue or faculty, which excites motion in heavy bodies, for what we have juſt mentioned, is the reaſon they generally aſſign for all ſpecies of movements. They ſhould not be allowed to diſpute or controvert what they themſelves

ſelves have advanced; and if they ſhould attempt to give a more rigorous definition of their opinion, they would fall into a ſtill greater abſurdity; which made the learned Father Saguens ſay, *Quis non palpat craſſitiem hujus chimericæ opinionis?* The Carteſians to account for this phenomenon, recur to the vertical motion of the ſubtil matter, which ſeparating itſelf from the earth, and purſuing the angle or direction of tangents to the circle, impels heavy bodies to deſcend. But this reaſoning has been confuted by moſt efficacious mathematical arguments. Gaſſendo, invented an effluvia compoſed of terraqueous corpuſcles, which mount into the air, and penetrate the pores of heavy bodies, which they generally encounter, after turning their firſt courſe into a deſcending one, and impel them downwards. Nothing has ſo much convinced me of the great difficulty of this queſtion, as ſeeing a man of the ſubtil ingenuity of Gaſſendo, recur for the ſolution of it, to a fiction deſtitute of all probability; and which is expoſed to invincible objections. Father Maignan, and his followers alſo, make uſe of the terraqueous effluvia for the ſolution of this difficulty; they do not allow that they act by impulſe, but that by their ſympathetic and magnetic virtue, when they come in contact with heavy bodies, they diſpoſe them to deſcend.

LXX.

LXX. It is very probable, and perhaps more than probable, that the aſcent of light bodies, is cauſed by the deſcent of heavy ones; becauſe the heavy body has power, in conſequence of the impetus of its deſcent, to occupy the lower ſtation, where meeting with the light body, it obliges him to leave that ſituation, and to mount upwards; for many argue with great colour of reaſon, that there is no ſuch thing as abſolute lightneſs to be conceived in any body whatever, nor is ſuch a quality neceſſary, a reſpective or comparative lightneſs, being ſufficient to anſwer every purpoſe. Thus we ſay a body is light, not becauſe it is void of gravity, but becauſe it is leſs heavy than the one with which we compare it. In the ſame manner we ſay the air is light, not becauſe it is not ponderous, but becauſe it is leſs ſo, than earth, water, and all the other bodies that ſurround us; and that no other levity but the reſpective, is neceſſary to cauſe bodies which we call light to aſcend, may be clearly ſeen in the caſe of oil, which notwithſtanding that it is heavy, if you pour a quantity of water into the veſſel where it is, the water on account of its ſuperior gravity, will occupy the inferior ſtation, and oblige the oil which was at the bottom to aſcend. The ſame thing happens with regard to air. If you dig a ditch to any depth in dry ground, the air will deſcend and occupy the whole

whole of it; and there is no other way to diſpoſſeſs the air from the bottom, and to make it riſe upwards, but conveying water into the ditch, or by throwing into it ſome body that is heavier than the air.

LXXI. It is not owing to the principles of phyſics, but to experience, that we underſtand the little we know of this matter; and with reſpect to this little, there ſtill remains great difficulties for philoſophers to contemplate; and the greateſt of all, is aſcertaining the cauſe of the aſcent of vapours to the region of the air. It is certain, that vapours are nothing elſe but water, reſolved into exceedingly minute particles. The water however being heavier than air, how can the water ariſe to the height occupied by the clouds? Every particle of water notwithſtanding it weighs very little, is much heavier than a particle of air of equal ſize, and the greater or leſs gravity of liquids, for the purpoſe of their impelling one another, is computed in the groſs, and not according to the proportion of globules of equal ſize; and we know that a pound of water, will cauſe a quarter of an hundred of oil to riſe in a veſſel.

LXXII. Some philoſophers, who were aware of this ſerious difficulty, upon reflexion, conjectured

tured that ſome portion of ethereal matter or pure air, might adhere to each particle of vapour; and in conſequence of this conjunction of the two, the whole might become lighter than an equal quantity of the inferior groſs air of our atmoſphere; and on this account, might mount on the top of it; for although iron is much heavier than water, if we faſten a ſmall portion of iron to a bit of deal board, it will ſwim, becauſe the quantity of iron and board together, is lighter than an equal bulk of water. Francis Bayle, adopts this opinion of a portion of the ethereal matter adhering to the vapour; and on the other hand, Father Pardies a French jeſuit ſuppoſes, that a particle of extended vapour, in the form of an air bubble, contains in its cavity the ethereal matter. All this is far from certain; but I ſhall not detain myſelf in controverting, either the one or the other of theſe modes of reaſoning. Others again imagine, that various igneous particles, which ariſe from the earth, after ſeparating from the water or ſome other liquid thoſe ſmall particles which we call vapour, with their continual impulſe and agitation, force them upwards. But neither does this ſyſtem appear to me very defenſible, any more, than that of the vulgar philoſophers, who ſay, the ſun by its activity attracts the vapours; for if this was ſo, the vapours would not ſtop till they reached

reached the ſun, or at leaſt till they were obſtructed in the heaven of the moon, by the moon itſelf, or ſome other ſolid body; for the attractive power is ſtronger, the nearer the thing attracted advances to that which attracts it; and the firſt would never ceaſe to move towards the other, till it came in contact with it, if it was not interrupted in its courſe by ſome obſtruction; and beſides, the attractive virtue is a certain ſomething, which nobody can comprehend, and is therefore in a manner wholly baniſhed from philoſophy.

LXXIII. Who would not be ſurpriſed, that phyſics ſhould not have helped us to attain a knowledge of ſo common a phenomenon, as that of the aſcent of vapours? but ſo far has it been from attaining it to any degree that comes near to truth or certainty, that hitherto, we have not been able to diſcover any thing upon the point, that is ſatisfactory to the underſtanding. And with reſpect to all other ſpecies of motion, we are in the ſame predicament.

SECT. XVIII.

LXXIV. Have we attained a knowledge of the cauſe of the elaſtic motion, which is the property

perty that makes a wand or a ſword-blade which is forcibly bent, recover of itſelf, the ſtraight form it had before, or if it was naturally bent or crooked, and was opened and made ſtraight by force, makes it return to its original crooked ſhape? Deſcartes, for the explanation of this phenomenon, recurs to his common aſylum, the impulſe of the ſubtil matter, which not being able to penetrate the pores of the wand or ſword-blade on the hollow ſide, where the pores are cloſed by the inflexion, by its great efforts to open and penetrate them, cauſes the wand or ſword-blade to recover its former figure. But who does not perceive, that for this purpoſe, it will be neceſſary to ſuppoſe the ſubtil matter ſhould be for ever moving in oppoſite directions, from weſt to eaſt, and upwards and downwards, &c. for the wand or ſword-blade, to whatever aſpect you turn the hollow ſide, recovers its natural figure equally the ſame? Beſides, Deſcartes ſuppoſes the ſubtil matter to be infinitely fluid, from whence it follows, that it will be impoſſible to ſhut the pores in ſuch a manner, as that they will become impenetrable to it.

LXXV. Others ſay, that the ſame impulſe which is impreſſed on a wand or bow by him that bends it, is the thing which opens it afterwards.

wards. But againſt this opinion, it may be urged in the firſt place, that he who bends it, does it gradually and by ſlow degrees; and the impetus with which it opens, is violent and quick. Secondly, the archer who bends a bow, is not poſſeſſed of a force equal to that, with which it reverts to its former figure, for that is ſo great when the arrow is drawn near the head, that it is capable of giving it an impetus, that will pierce a ſubſtantial thick body through and through; and how can any one communicate a force or impulſe, which is greater than that he poſſeſſes?

LXXVI. The Ariſtotelites, who are great adepts at the eaſy invention of giving the name of quality, virtue, or faculty, to expreſs the cauſe they are enquiring after, and by the addition of an adjective to that name, which is a denomination taken from the effect, ſay, that the cauſe of the elaſtic motion, is an elaſtic virtue which is inherent in the wand or ſword-blade. This is in reality, having found out a maſter key, to unlock all the myſteries of nature; for there is nothing ſo obſcure, that with this invention may not be made manifeſt. If you aſk, what is the cauſe of the marvellous properties of the loadſtone, the anſwer is, the magnetic virtue; if you aſk, what are the cauſes that perform in us the operations, of the concoction of aliments, the expulſion

pulſion of excrements, and that of nutrition, &c. the anſwer is, that they are performed by a concoctive virtue, an expulſive virtue, and a nutritive one; and according to the ſame mode of reaſoning, the cauſe of the winds, is a ventilating virtue, that of lightning a fulminating one, and that of the flux and reflux of the ſea, is owing to two oppoſite virtues, the one fluxive, and the other refluxive. By this cheap mode of philoſophizing, every thing is demonſtrated at a glance. But to ſpeak ſeriouſly, what is this, but anſwering in the very language of the queſtion? Saying that the cauſe of the elaſtic motion, is the elaſtic virtue, is in effect the ſame as ſaying, the cauſe of the elaſtic motion, is the cauſe of the elaſtic motion; and ſaying the magnetic virtue, is that which cauſes the load-ſtone to attract the iron, is anſwering in the ſtile of pleaſantry, which ſome children have ſtudied, and are very ready at; who when a perſon aſks one of them, *My lad, whoſe ſon are you? the boy anſwers my father's.*

SECT. XIX.

LXXVII. The cauſe of the progreſſive motion, is alſo very difficult to be accounted for. It is hard to comprehend, how the motion of a ſtone

ſtone thrown from the hand ſubſiſts, after the action of throwing it ceaſes. Who moves the ſtone after the hand is ſtill? What many of the Ariſtotelites ſay, is, that the action of the hand produces a quality in the ſtone, which they call impetus, and that this quality cauſes the ſtone to move after it is thrown from the hand. But this ſolution, is deſtitute of all appearance of truth. If every violent motion, as the Ariſtotelites maintain, proceeds from an extrinſic cauſe, how can the motion of the ſtone thrown in a mounting direction, which is a violent one, proceed from an intrinſic quality communicated to the ſaid ſtone? If all generation, or accumulation, according to the doctrine of the ſame ſchool, ſuppoſes corruption, what quality or accidental form in the ſtone was corrupted, to prepare it for engendering that new quality, which they call impetus? What diſpoſitions preceded this generation? Or what time is there for their preceding it, when a globe of great bulk, with its motion impels a little one? It being certain, that the contact of the two, does not continue longer than an inſtant, what property then has that quality, to occaſion ſo quick a corruption? Is it perchance, the gravity of the ſtone itſelf? This however, as it ſubſiſted at the time of receiving the impulſe, if it is a property oppoſite to that quality, would at the inſtant, have prevented its genera-

generation, as it is afterwards said to impede its conservation. We might make many other reflexions, to prove, that that quality is chimerical. Others recur to the air, for the means by which the motion is continued, which they say, being violently divided by the fore part of the stone, takes a sudden turn to the hinder part, and impels the stone forward. But omitting many other objections, which would render this mode of philosophizing totally improbable, I shall just remark, that it would follow from hence, that a stone could not move through a void space, give it what impulse you will, which is what I imagine nobody can believe. Descartes, reconciles this difficulty, with his maxim respecting the general law of the communication of motion, established by the Author of nature at the creation, which we shall not combat minutely, in order not to waste time; but shall content ourselves with observing, that that maxim applied to the present matter, and throughly investigated and explained, would signify, that the stone thrown from the hand, moves because God has ordained that it should move; but to solve difficulties in this way, it is not necessary to study philosophy.

SECT. XX.

LXXVIII. Finally, there is no motion whatever, about the cauſe of which, the philoſophers do not altercate. What conteſts have there been among them, to explain how the movements of rarefaction, and condenſation are performed? Some fancy, that rarefaction conſiſts, in the ſame quantity of matter occupying a larger ſpace; which explanation, others looking upon as unintelligible, aſſert, it conſiſts in the opening of the pores, and the extenſion in conſequence of that opening, of various parts of the body, by the introduction of a ſubtil liquid ſubſtance, in the ſame manner that water enters a ſponge, or as rarefied air enters water, or the ætherial matter inſinuates itſelf into the air. This is the doctrine of the Carteſians; but in the opinion of the Maignaniſts, and Gaſſendiſts, ſuch reaſoning is nothing to the purpoſe; for theſe, as they admit in nature, not only of the poſſibility, but of the neceſſity of a vacuum, or many voids diſtributed in ſmall interſtices, find no inconvenience in ſuppoſing, that in bodies, there are ſmall empty ſpaces, unpoſſeſſed by any matter whatever.

LXXIX.

LXXIX. Fermentation, this ſolemn inſtrument of nature for the performance of an infinite number of her works; conſiſts in nothing, but an inteſtine motion of the inſenſible particles of the mixtures, by which is ſolicited, a new combination of their elements. But from whence does this motion proceed? The Moderns, ſince the diſcovery of the acid and the alkali by Otho Takenius, attribute all the fermentations, to the meeting of theſe two ſubſtances. But this is only pointing out the matter, on which this motion has its effect, and we do not enquire here for the material cauſe, but for the efficient one. Who, or what, impels the acid and the alkali to this conflict? The juice newly expreſſed from the grape, will quiet this combuſtion for ſome little time; but after that, the tumult begins again. What new agent can we diſcover here, to excite the ſecond fermentation? This is a ſecret, which only the Carteſians have preſumed to unravel, by recurring to their inviſible fairy, *the ſubtil matter*; whom they make the author of all this domeſtic ſedition. It is with ſome propriety that I call it a fairy; for as the vulgar attribute to the fairies, all the nocturnal noiſes and commotions, whoſe cauſes they are ignorant of; ſo the Carteſians impute all thoſe motions, which on account of the darkneſs that obſcures

their cauſes, may be truly termed nocturnal, to the impulſe of the ſubtil matter.

LXXX. I am ſo far from believing, that the ſubtil matter is the *primum mobile*, or firſt mover of every thing, that I am inclined to think, it moves nothing. My reaſon for this opinion, is as follows. The more fluid a matter is, ſo much the leſs impulſe it makes on any body it encounters. Thus we ſee, that water gives a much leſs violent ſhock to a wall, than any other ſolid body of equal ſize, that may be forcibly driven againſt it; and air, a much leſs than water. No building could ſtand againſt, or reſiſt a moderate gale of wind, if the air was as ſolid as water. The ſubtil matter then, according to the doctrine of the Carteſians, being infinitely fluid, can have but little impulſe, or be able to impreſs but little agitation or motion, on the bodies it encounters. This conſequence to me, is clear and plain; becauſe, if in proportion to the augmentation of its fluidity, the impulſe of a body is leſſened, when the fluidity comes to be infinite, the impulſe will ceaſe totally. From hence it would follow, that there is no body whatever, which could be moved by the impulſe of the ſubtil matter.

LXXXI. But admiting that it has power, as the Carteſians pretend, to move the inſenſible particles

particles of the mixtures; it will not follow from thence, that it furniſhes us with an explanation of the preſent phenomenon. For in the firſt place, the ſubtil matter, if it has any impulſe, exerciſes it on the particles of the juice the inſtant that it is preſſed from the grape; and even perhaps did it before, while the liquor was contained within the outſide ſkin or covering. How then does it happen, that it did not ſooner excite that tumult, which is the ſymptom and property of fermentation? Secondly, how can the acids and alkalies be ſaid to produce this effect? for, according to the doctrine of the Carteſians, of whatever particles the mixtures conſiſt, the ſubtil matter would ſet them in motion, for that there is no mixture whatever, impenetrable to its extreme ſubtilty. Thirdly, how can thoſe exceeding ſlow fermentations, which are years before they manifeſt themſelves, as in the inſtance of treacle, be attributed to the rapid and ſwift motion of the ſubtil matter?

SECT. XXI.

LXXXII. Saint Auſtin ſays wiſely, that what is moſt ſurprizing, does not ſeem to ſtrike us, although it is the object of our daily experience; which is a maxim, the ſaint applies to the won-

ders of nature, and falls in exceedingly *à propos* to suit with our present discussion. All the philosophers he observes, admire as portentous things, the flight of the iron to the load-stone, the pointing of this last to the poles, and the flux and reflux of the ocean. If we ask them why they consider these motions as wonderful, they will answer, it is because they cannot ascertain their causes. But we cannot help remarking, that this answer amounts to a virtual acknowledgment, that all the movements of nature are equally wonderful, with those of the iron, the load-stone, and the ocean, for their causes are equally disputed, because we are equally ignorant of them. The only difference between them is, that these motions are confined to particular or determined entities, and the others are common, or nearly common to all.

LXXXIII. I confess for my own part, that on whatever side I view nature, I equally wonder, because I find myself equally ignorant of it. The same Saint Austin, whom we have just quoted (Tract. 24. in Johan.), observes, that the ordinary multiplicarion of grain, which is obtained at harvest, by means of the fertility of the earth, is equally a prodigy, with that extraordinary multiplication of loaves and fishes, which was effected by the majesty of Christ in the

the deſert. Let now the vain philoſopher boaſt, that he is able to decipher that great myſtery, only becauſe he is poſſeſſed of a compleat apparatus of faculty phraſes; ſuch *as ſeminal virtue, previous diſpoſitions, the corruption of one form, and the introduction of another, attraction of the nutritious juice, the converſion of it into the proper ſubſtance, vegetation, nutrition,* &c. Was Saint Auſtin peradventure ignorant of thoſe phraſes, or of others equivalent to them? Yet notwithſtanding this, he looked upon that natural multiplication of grain, as an impenetrable myſtery. Theſe phraſes, only expreſs or deſcribe thoſe operations which are familiar and open to our experience; but do not reveal to us, their cauſes, or the manner in which they are performed. The ruſtics, are acquainted with many more terms than we, expreſſive of the various operations with which nature in ſucceſſion, proceeds to perfect that work. Are they peradventure on this account great philoſophers? what do I explain, by calling vegetation or nutrition, that progreſſion, by which a plant acquires its increaſe in bulk? does this afford me any philoſophical knowledge, reſpecting the manner in which that operation is performed? There are two principal things to be conſidered in vegetation; the firſt is, the aſcent of the nutritious juice by the fibres of the plant; the ſecond is,

the converſion of this juice into the vegetable ſubſtance; and we perceive in thoſe two things, two great myſteries. If we aſk the ſchool philoſophers, how the nutritious juice which is ponderous, riſes ſpontaneouſly to the very uppermoſt leaves of the higheſt trees, they will tell us that it riſes by attraction. And what is this, but placing us is the ſame ſtate of doubt and difficulty, with reſpect to the moſt common work of vegetation, that we remain in, with reſpect to the motion of the iron to the loadſtone? Both the one and the other are called attraction, but we are equally ignorant, why, or how, the higheſt leaves of a tree attract the juice which riſes from the bowels of the earth, as we are, why or how the load-ſtone attracts the iron.

LXXXIV. Let us proceed to the ſecond myſtery. Who can explain to me, the manner in which a juice that is ſo exceedingly fluid, ſubtil, and fine, as to be able to circulate through the ſmalleſt channels of the fibres, is afterwards converted into the ſolidity of wood or grain; and this difficulty will increaſe, if we caſt our eyes on the other mixtures, and reflect, that from another juice, or rather moſt fluid vapour, is generated copper and marble. Ariſtotle had certainly ſome reaſon for ſaying, that nature was

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the very devil: *Natura dæmonia eſt, non divina* (Lib. de Præſenſ. per ſomnum); for by obſerving her works with attention, it ſeems as if ſhe did every thing by enchantment.

SECT. XXII.

LXXXV. It would be even ſome conſolation to us under our ignorance, if only the manner, in which nature works in the interior part of her operations, was hidden from our eyes; but the moſt humiliating circumſtance is, that it is the ſame, with reſpect to every thing that immediately preſents itſelf to our ſenſes. Bodies are familiar to our touch; but hitherto, we have not been able to diſcover, whether they are compoſed of indiviſible points, or of parts infinitely diviſible; nor to what it is owing, that one body is hard, and another ſoft, one ſolid, another fluid, one opake, and another diaphanous. We are continually viewing colours; but we do not yet know, what ſort of things colours are; whether they are mere reflexions of the light, or whether they are intrinſic accidents appertaining to the object. The light illuminates, and aſſiſts us to ſee; but we find our underſtandings greatly obſcured, when we conſider the nature of light. Whether we conceive it to be ſubſtance, accident, body, or ſpirit, none of them are applicable

ble to its nature, and ſtill they all ſeem to be ſo. And with how many impenetrable doubts and difficulties are we ſurrounded, when we conſider the ſpecies which we call viſible? If there is any one difficulty ſuperior to, or any one inequality more ſtriking than another in the myſteries of phyſics, I will venture to pronounce this is it. How the viſible ſpecies of a ſtar in the firmament, can in an inſtant, be tranſlated from the ſame ſtar to our eyes, when it muſt travel in that inſtant many thouſands of miles, is beyond conception; as is likewiſe, how this ſpecies can exiſt at one and the ſame time, in the whole immenſe ſpace between this and the firmament; it being certain, that in all this ſpace, there is not a point, from which, by taking the view, you will not ſee the ſtar. How alſo, contrary to the maxim of Ariſtotle, can many material ſpecies, differing only in number, exiſt or be ſeen, from the ſame point of ſpace; it being certain, that you may from ſuch an identical point, ſee diſtinctly, many ſtars at the ſame time? I ſhall omit many other objections, that are not inferior or leſs forcible to thoſe I have urged, againſt the common opinion, that might be alſo urged, againſt the mode of reaſoning of the modern philoſophers.

SECT.

SECT. XXIII.

LXXXVI. So that we see, our philosophy, from what we call first principles, down to our ultimate conclusions, is nothing but a fabrication, or weaving together of fallible conjectures; and that even these conjectures, terminate in nothing more than certain general notions; for the nature of all the specific things, and the greatest part of the causes respecting the lowest species, are so far removed from our penetration, that we can hardly arrive at attaining a doubtful idea of them. If we hit upon a truth, we owe the knowledge of it to experience, and this cannot be called scientific knowledge; for it is derived from self-evident principles, which may be comprehended by the most stupid of mankind; between whose manner of explaining the matter, if they attempt doing it, and ours, there is only this difference, that we define it in terms of art, and they in ordinary and common ones, which are better than the others, because they are more intelligible. This made the learned Jesuit Claudius Franciscus Dechales say, that our physics consisted of nothing but a particular idiom, which conveyed no certain knowledge of any thing. (Tom. I. tract. de Progressu Matheseos).

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LXXXVII. It is much to be lamented, that thoſe who are called profeſſors in the ſchools, do not know more of the nature of things than the vulgar. But what would you think, if I was to ſay now, they know even leſs? It would ſeem, as if I was advancing an extravagant paradox; but notwithſtanding this, I aſſert that the propoſition is a moſt true one, and may be eaſily proved; for as experience is the only channel, through which a knowledge of nature can be conveyed; they muſt have the beſt experimental knowledge of natural things, who in various mechanical occupations, work up various natural entities; and not thoſe who amuſe themſelves with ſpeculations, and live retired in ſchools. A fiſherman, knows ſomething of the properties of fiſh; a pilot, of the winds and the tides; a ſportſman, of birds and wild animals; and a huſbandman, of the generation and increaſe of plants. But what does the philoſopher know? why, he knows how to raiſe doubts about every thing, and that is all. Thus the ſchool of phyſics is a theatre, where people are taught to doubt without end. I ſay without end, becauſe it is ſcarce poſſible the period ſhould ever arrive, when they will be able to paſs from doubt to certainty. This may be clearly inferred, by their diſputing at this day with

with the ſame obſtinacy, the ſame queſtions they diſputed two hundred years ago. If any elucidation, or certain knowledge, has been acquired with reſpect to here and there a phyſical theorem, we are not indebted for it to the ſchools, but owe it to the benefit of experience, which comes from the world at large. We may thank the experiments of Torriceli, Monſieur Paſcal, Otho Guerricus, and Boyle, for our knowledge that the air is ponderous. If we are certain, that the blood circulates from the heart through the arteries, and is returned by the veins, we owe the diſcovery to the anatomical obſervations of Peter Paul Sarpi and William Harvey. If we are clear, that the chyle is not conveyed to the liver, but to the heart; what aſcertained this truth, but the diligent and practical ſcrutinies of John Paqueto, Thomas Bartolino, and the Engliſhman Lowther? Experience has been the only arbitrator, which has ſettled ſome diſputes, and baniſhed certain errors from the ſchools; and wherever matters have been left to ſpeculation and reaſoning, the ſuit ſtill remains depending and undetermined. One age and another paſſes away, and the world during the whole time, has been accuſtomed to hear the ſame vociferations, the ſame arguments, and the ſame diſtinctions; and has ſeen the obſtinacy of the contending parties, transferred, as if it were

were by hereditary ſucceſſion, from profeſſor to profeſſor, without the leaſt proſpect, either of victory or reconciliation.

SECT. XXIV.

LXXXVIII. From this known ignorance of ours, we may deduce a very uſeful reflexion, which is, to be firm and ſteady in obſerving a due ſubjection to the ſacred dogmas of faith. The inordinate confidence we place in our own reaſon, is a great enemy to religion. He who eſtimates his own underſtanding at an exceſſive high rate, reſts his faith on the edge of a precipice; for this vanity has ſhewn itſelf very glaringly, in all the hereſies we ever knew. In their purſuits of other vices, mankind have taken different turns, but in this they have been all uniform; for although they have neither been all laſcivious, nor all covetous, nor all ambitious; ſtill in this inſtance, they have all preſumed much on their own underſtanding. And what can be a more efficacious antidote againſt this mad preſumption, than reflecting upon the little or nothing, we have been able to diſcover in matters of philoſophy? how can he, who knows he cannot penetrate the miſteries of nature, dare attempt fathoming thoſe of grace? If he reflects, there

there will result from that reflexion, a distrust of his own reason, and he will submit himself obediently to authority. The philosopher Anaxagoras, whom on account of the extraordinary subtilty of his ingenuity, they by way of eminence, called the soul or spirit of antiquity, after having laboured with infinite industry in philosophy, said, that nature was all surrounded with clouds and darkness. *Anaxagoras pronuntiat circumfusa esse tenebris omnia.* (Lactant. lib. iii. Divin. Instit. cap. 28.) And I must observe, that this philosopher, who knew nature was impenetrable to his understanding, was the first of all the philosophers, if we believe Aristotle, Laertius, and Plutarch, who declared himself convinced of the indispensable necessity of a supreme intelligence, who must be the author and director of the whole. On the other hand, those who boasted, and flattered themselves that they had discovered all the mysteries and profundities of nature, for the most part, denied either the existence, or the providence of a deity.

LXXXIX. I can with truth say of myself, that next to the divine grace, a conviction of my own ignorance with regard to natural things, is the most powerful weapon I could ever discover, wherewith to overcome all those difficulties or

objections, which natural reaſon ſuggeſts, againſt the myſteries of faith. I often ſay to myſelf, good God! how can I underſtand thoſe wonders, which by uſing his extraordinary power, are wrought by the omnipotent hand, if I cannot comprehend, the common effects of his ordinary power? It is true, I am ignorant how, or by what means, a divine perſon can unite himſelf to human nature; but I am alſo ignorant, how a ſpiritual ſoul can be united to a material body. Notwithſtanding which, this is a matter of fact, and happens within myſelf. Neither do I perceive, how the ſame water which falls from heaven, ſhould be converted, not only into here and there a particular body, but into all the animal and vegetable ſubſtances upon earth. In the moſt plauſible part of theological controverſy, I find myſelf exceedingly embarraſſed; for if I take the ſide of providence, I am aſſailed with the forcible arguments in favour of liberty; and if I put myſelf on the ſide of liberty, they wage powerful war againſt me with the arguments in favour of providence. But do not I ſee the ſame arguments, urged with greater vehemence, in the vulgar philoſophical controverſy reſpecting the compoſition and unity of univerſal ſpace, in which, whatever ſentiment is maintained, they inſtead of anſwering their opponents arguments, perplex the diſpute with a multiplicity

tiplicity of words? If I defend, with Ariſtotle, the infinite diviſibility of univerſal ſpace, although to avoid being concluded, I don't do it with my mouth, I cannot in my mind, help acknowledging the unity of a great number of its parts; and if with Zeno I acquieſce in the indiviſibility, the mathematical arguments derived from the diagonal of a ſquare, two concentric wheels united, and many other principles, not only leave me without an anſwer, but in a manner ſtrike me dumb.

XC. I ſay again, if in thoſe natural things that are open to our view, and which we touch with our hands every day, there occur a thouſand difficulties, that are inſuperable to, and beyond the reach of our underſtandings, have we not the greateſt reaſon to ſuppoſe, that the ſame thing happens with reſpect to ſupernatural matters, they being totally ſuperior to the ſphere of our ſenſes? If, maugre all my prying, I can't perceive how God does an infinite number of things, which I ſee him do every day, would it not be madneſs in me, to deny or to doubt the exiſtence of revealed things, only becauſe I can't deſcry how God executed thoſe things?

If there was a man ſo ſhort-ſighted, that he could not ſee objects that were very near him, and ſhould pretend that he ſaw thoſe

which were at the diſtance of a hundred miles from his eyes, or elſe ſhould take it into his head to inſiſt, that ſuch objects, although they are well known to be *in eſſe*, do not exiſt, only becauſe he can't ſee them, would not all the world pronounce him a lunatic? This is exactly the ſame ſort of madneſs as that of thoſe who deny there are divine myſteries, only becauſe they can't comprehend or pry into them. Little vain ſtupid man, if the fabric of thoſe material compoſitions which are ever before your eyes, and are at all times familiar to your touch, is totally impenetrable to your ſhort and limited capacity, how can you expect to comprehend the ineffable manner, in which Omnipotence performs thoſe ſupernatural wonders? You will tell me, that you can find no ſolution of the arguments, which the Gentile urges to you againſt the myſtery of the Trinity, or againſt that of the Incarnation; and I anſwer, that neither can you find any, to thoſe the philoſopher urges againſt the compoſition of univerſal ſpace, take which ſide of the queſtion you will, and ſuppoſe it to be made up, of either diviſible, or indiviſible matter; but would you conclude from thence, that it is not compoſed of either one or the other? you certainly would not; and it would be equal, if not greater delirium, to deny the truth of thoſe myſteries, only becauſe you can't anſwer, and remove

move the objections that are made to them. Is it fit, that an Infinite Power ſhould proportion his works, to the limited meaſure of your underſtanding? or is it reaſonable to ſuppoſe that God can do nothing, which you can't comprehend?

XCI. No north wind, ſo quickly diſperſes the clouds which interrupt the rays of the ſun, as theſe reflexions clear up the doubts, which natural reaſon oppoſes to the myſteries of faith. Leave then the preſumptuous dogmatiſts to chew their ſcepticiſm, and to make the moſt of the objections it furniſhes againſt religion. But the ſort of ſcepticiſm, which is preciſely limited and confined to phyſics, is ſo far from prejudicing faith, that it ſerves to confirm and rivet it; by removing the obſtacles, which the preſumption of natural reaſon throws in the way, to interrupt the effect of that humble docility, which is ſo neceſſary, to preſerve the underſtanding in a due ſtate of ſubjection to the authority of revelation.

XCII. Thoſe men do great injury, not only to philoſophy, but to the church alſo, who raſhly endeavour, to intereſt the doctrine of revelation in the defence of their particular philoſophical opinions. This the heretics lay hold of, to ca-

lumniate us with converting philoſophical ſentiments, into articles of faith; and by this artifice, they perſuade their followers, that our belief is arduous, and unneceſſarily complicated. Upon this preſumption, ſome ſtrangers found their aſſertions, when they accuſe us of countenancing idiotiſm, and mixing it with religion. It is but a little while ago, that one of them declared in his writings, that the opinions of men in Spain were not more free, than their perſons were in Turkey. In order to preſerve a due reſpect for ſacred things, it is neceſſary, not to confound them with profane ones; whoever ſhould begin to erect habitations in temples, would be the author of temples loſing that reſpectful reverence that ought to be preſerved in them. There are judges appertaining to the church, whoſe province it is, to determine what doctrines are uſeful, what pernicious, and what indifferent. Let us then leave the deciſion of thoſe matters to them, and don't let thoſe who ſincerely ſeek the truth, be terrified and diſturbed by thoſe ſcare-crows that are ſet up by partiality and faction, and ſometimes by the pride of thoſe, who have given their names to particular ſchools, or by the envy of others, who could not arrive at doing ſo much.

SECT.

SECT. XXV.

XCIII. We having ſhewn now, that we poſſeſs no phyſical ſcience or demonſtrative knowledge of natural things, we may entertain a reaſonable doubt whether we ſhall ever be able to attain any ſuch. The moſt learned Valles, is clear that we ſhall not; becauſe phyſical knowledge is confined to ſingular things, and alledges that from ſingular things, you can't derive a ſcience. But as we have obſerved before, this argument is ill founded, and inſufficient.

XCIV. We might lay more ſtreſs upon two authorities the ſceptics alledge in their favour, which are taken from the Eccleſiaſtes. The firſt is from Chap. III. in theſe words. *Cuncta fecit bona in tempore ſuo, et mundum tradidit diſputationi eorum, ut non inveniat homo opus, quod operatus eſt Deus ab initio uſque ad finem.* The ſecond is more formal and preciſe, and taken from Chap. VIII. *Et intellexi, quod omnium operum Dei nullam poſſit homo invenire rationem eorum, quæ fiunt ſub ſole: et quantò plus laboraverit ad quærendum, tantò minus inveniat, etiamſi dixerit ſapiens ſe noſſe, non poterit reperire.* But in truth, theſe texts, when they affirm the impoſſibility of diſcovering the cauſes and reaſon of natural effects, may be underſtood to allude to the providential, and not to the natural or

phyſical ones. In fact, this is the ſenſe in which ſome fathers and expoſitors underſtand them.

XCV. Others again argue, that the deſire of knowing the cauſes of natural effects, is natural to, and implanted in man by nature itſelf; and as a natural deſire can't prompt a man to an impoſſible inquiry, it follows, that attaining the ſcience we are ſpeaking of, is within the compaſs of poſſibility. To this argument, Valles replies, it is abſolutely poſſible; and although not in this life, it is in that to come, at which period, the bleſſed will ſee with God all things moſt clearly. This ſolution is attended with the following difficulty, that a natural deſire can't be directed to an impoſſible object; neither can it terminate in a ſupernatural one; and the knowledge the bleſſed will have of ſupernatural things, muſt be entitively ſupernatural, becauſe it will depend immediately on the light of glory. Upon the whole, we may ſuppoſe, that there may belong to the ſoul in a ſtate of ſeparation from the body, abſtracted from the ſupernatural bleſſing of the light of glory, a certain knowledge of all material things, in conſequence of the ſpecies, infuſed in the courſe and order of nature; which is the ſentiment of Egidius Romanus, Father Saurez, and others; and this knowledge being natural,

natural, may poſſibly be the effect of the thirſt we poſſeſs for acquiring it in this mortal life.

XCVI. But we can't help remarking, that the foregoing argument does not ſtand in need of this ſolution, becauſe it proceeds upon a falſe ſuppoſition not adverted to by Valles; which is, that the deſire of knowing things philoſophically, is a principle implanted in man by nature. If this was ſo, all men would be impreſſed with this deſire, which is not the caſe; for the greateſt part of them ſeem to have no paſſion at all for phyſics; and many deſpiſe philoſophical ſpeculations, as uſeleſs, vain, and by no means entertaining. It is true, that all men are deſirous of knowledge, but this deſire is not directed in all of them to the ſame object, or to the ſame ſpecies of objects. Generous ſouls are naturally lovers of truth; but the majority, are only anxious to underſtand thoſe things, the knowledge of which, may contribute to the gratification of their paſſions.

XCVII. We have ſeen the little force of the arguments urged on both ſides, with reſpect to the doubts we have been canvaſſing. On which account, I won't venture to give ſentence in the queſtion. Nor do I, nor can any one elſe without the aſſiſtance of Revelation, know the juſt

limits of the human underſtanding with regard to natural things. And although the various philoſophical ſyſtems which have hitherto been invented, are expoſed to great doubts, or are impeachable of containing manifeſt nullities in them, who knows but that, in future ſome one may be diſcovered ſo compleat, and ſo well founded, that the underſtanding may be convinced of the truth of it. My opinion is, that if this is ever to be accompliſhed, it muſt be done by purſuing the plan and method preſcribed by my Lord Bacon. It is true, that this is ſo laborious and prolix, that the execution of it may be apprehended to be morally impoſſible; for although the monarchs of two very powerful kingdoms, France and England, for the ſpace of more than a hundred years, have cauſed four hundred able men, at a great expence, and under proper regulations, to be employed in making innumerable experiments, and in reaſoning upon, and explaining them, the work is not yet far advanced; when then may we expect to ſee it accompliſhed? The Academy of Sciences at Paris, and the Royal Society of London, don't amount to more than a ſhred of my Lord Bacon's extenſive project.

On

On the Shew or Affectation of Learning and Knowledge.

SECT. I.

1. SCIENCE, like Virtue, has its imitators and its hypocrites; and the vulgar are as much impoſed upon by the one as the other. The numbers of unlearned people who paſs for men of literature, is conſiderable; and the falſe appearances they put on, becomes a copious ſource of errors, both particular and common. In this earthly region which we inhabit, apparent learning is as much reverenced, and oftentimes as much reſpected, as true. There are thoſe, who are very expert at putting on the ſemblance of learned men, and of impoſing themſelves as ſuch upon the world, although the portion of literature they poſſeſs is but very ſmall; however, if they have the addreſs to make their copied imitation of it appear an original painting, the copy will often make the ſame impreſſion on mens minds, as if it actually was

was an original. When Zeuxis with his pencil imitated grapes, the birds flew with as much eagerneſs to eat the painted, as if they had been real and natural grapes.

II. In the eleventh century, Arnoldus Brixiens, who was a man of but little literature, did great miſchief with his errors, both in his own country, and even in Rome itſelf; for as Gunterus Ligurinus obſerves, that beſides being an elegant reaſoner, he had the addreſs of giving himſelf the air and appearance of a man of learning; *Aſſumpta ſapientis fronte, differto fallebat ſermone rudes*; or as Otho Frinſingens remarks, a copious verboſity paſſed in him for knowledge and erudition; *Vir quidem naturæ non hebetis; plus tamen verborum profluvio, quam ſententiarum pondere copioſus.* Thus Vigilantius, although he was an ignorant man, by his art in gaining over to him bookſellers and publiſhers, who were the proclaimers of his fame, ſo far acquired the reputation of a perſon of literature, that he had the aſſurance to write againſt Saint Jerom, and to accuſe him of being an Origeniſt.

III. The vulgar, who are incompetent judges of men of letters, are apt, although it is againſt their own intereſt, to countenance and give credit to unlearned perſons, whoſe deceptions in conſequence

quence of this encouragement become formidable. The deluſion of popular ignorance is apt to magnify a very ſmall light, into the blaze of a flaming torch; and to fancy it is as luminous, as the lanthorn placed on the top of the tower of Pharos, which Pliny ſays, at a great diſtance off, appears like a ſtar to thoſe who navigate the ſea of Alexandria.

IV. It may not be improperly remarked, that in order for a man to be eſteemed a perſon of learning with the populace, it is not ſo neceſſary that he ſhould really be one, as that he ſhould put on the pompous appearance of ſuch a perſon. Arrogance and verboſity, if they are accompanied with a ſmall degree of diſcernment, that helps a man to judge, when are the proper times to talk, and when to hold his tongue, and what are the ſubjects he ſhould diſcourſe, and what be ſilent upon: I ſay, if he has a little diſcretion to know how to conduct himſelf in theſe particulars, ſuch management will have a notable effect. A confident magiſterial air in his deciſions, and an artificial geſture, which when he ſprinkles about the little he underſtands of the ſubject he is talking upon, and which ſeems to indicate that he has an infinitely greater ſtock of knowledge of the matter treaſured up in his inſide; ſuch affected appearances, I ſay, will have

great weight and efficacy to faſcinate the ignorant vulgar.

SECT. II.

V. On the other hand, men of true learning, are modeſt and candid; but theſe two virtues, are enemies, and alſo great obſtacles to the advancement of their fame. He who knows moſt, is ſenſible, that what he really knows, falls greatly ſhort of what he is ignorant of. His diſcretion teaches him this, and his ſincerity induces him to confeſs it; but his acting in this manner, greatly obſtructs his gaining the applauſe of the world; for theſe confeſſions have the ſame effect, that the evidence of thoſe have, who bear witneſs againſt themſelves; that is, they are readily believed; and although it is impoſſible for any man to know every thing, the vulgar are very unwilling to eſteem him learned, who owns himſelf ignorant of the leaſt matter in his own profeſſion.

VI. Men of learning, are alſo moſt commonly timid, becauſe they are apt to be diffident of themſelves; ſo that although all they ſay ſhould be divine, if it is pronounced with a tremulous tongue, and a faltering voice, it makes no impreſſion on thoſe who liſten to them. A man would gain more credit with the world in general, by talking loud, and making extravagant bold aſſertions,

tions, than by reaſoning diffidently, and as if he was not quite clear; for the eſtimation due to diſcreet doubts has always been ſuppreſſed, and in conſequence of this ſuppreſſion, has contributed to countenance errors, and beget falſe concluſions. How has a preſumptuous ignorant fellow, frequently availed himſelf of his impoſing geſture, and the loudneſs of his voice? and how much by the ſtrength of his lungs has he often concealed the weakneſs of his argument? But in truth, the noiſe made by a vociferous perſon, ought to render his ſolidity ſuſpected; becauſe men, like other ſonorous machines, are loudeſt the more hollow and empty they are.

VII. If to theſe impoſing appearances, there happens to be joined a moderate portion of literature, it has a moſt powerful effect to captivate the vulgar, and to gain popular applauſe. In the inſtance of Luther, who although he might truly and properly be ſtiled a man of learning, ſtill the forcible manner in which he delivered himſelf, added to his addreſs, may be ſuppoſed to have contributed more to the ſucceſs of his preaching, than his literature.

SECT.

SECT. III.

VIII. There are qualities alſo, which give people the reputation of able and learned men, when in reality they are quite the reverſe. Gravity and circumſpection, whether they are natural or artificial, contribute much to produce this effect. Gravity, ſays Magdalen Scuderi in one of her moral converſations, is a bodily myſtery, invented to conceal the defects of the mind; and if it is carried to exceſs, elevates the perſon who wears this appearance, to the rank of an oracle. But I can ſee no reaſon why a perſon on this account, ſhould be eſteemed more than a man, becauſe that the nearer he reſembles a ſtatue, he in reality is by ſo much leſs than a man; nor why riſibility, being the diſtinguiſhed mark of rationality, he ſhould be eſteemed the moſt rational, who is the leaſt addicted to laughter. The ingenious French author Montaigne, ſays pleaſantly, that among the whole brute creation, there is no animal ſo grave as an aſs.

IX. Ariſtotle conſidered melancholy as a token of ingenuity. But I can't tell why he did this; for every day's experience convinces us, that there are melancholy people who are very dull and ſtupid. If we were to judge of things as they appear to us at firſt ſight, we might be eaſily

eaſily induced to confound the ſtupid with the thoughtful, and to miſtake the one for the other. People of dark and gloomy geniuſes, have in ſome meaſure, the air and appearance of profound thinkers; but if we reflect, we ſhall be convinced, that inſociability is not a characteriſtic quality appertaining to a rational being. In thoſe who look as if they were always abſorbed in thought, the negotiation or operation of the interior part of the ſoul ſeems to be inverted. Inſtead of the underſtanding ſurveying and contemplating the ſpecies, the ſpecies ſeem to ſeize upon, and take poſſeſſion of the underſtanding; and inſtead of the mind being maſter of the object, the object appears as if it was maſter of the mind; and the ſpecies that appear to ſeize upon it ſeem as if they bound it down, and kept it confined. A perſon in this ſtate ſhould not be ſaid to be contemplative, but ought more properly to be compared to a man that is ſtunned; the immobility of whoſe thoughts, keeps his reaſon in a ſtate of ſuſpence. I obſerve, that there is no brute of a more feſtive and ſociable diſpoſition than a dog; and that there is no one which is endued with a more noble inſtinct; yet, maugre this experience, I look upon the oppoſite extreme to exceſſive gravity to be the worſt ſymptom of the two; for men who are always giggling and bantering, are generally very ſuperficial.

X. But both the ſilent and the loquacious have their partizans. Some conſider men of few words to be the moſt ſagacious, and others give the preference to thoſe who are rather prodigal in their uſe of them. The talking but little, is occaſioned either by exceſſive caution, or by fear, or elſe is the effect of modeſty, and the want of a ready flow of words; but not, as is commonly thought, does this indicate a want of knowledge. There is no man, who if he was to ſpeak all he thinks, or that occurs to him, would not talk a great deal.

XI. There are ſome, who obſerve an artificial medium between talking and holding their tongues, which is very well adapted to attract the veneration of the vulgar; that is, they ſpeak with confidence upon ſuch things as they underſtand, and take care to be ſilent upon ſuch as they are ignorant of; but this they do, in a manner as if their ſilence proceeded from reſerve, and an unwillingneſs to enter upon the ſubject. By theſe artifices, men of very moderate capacities, and whoſe informations are very limited, paſs themſelves upon the world for perſons of deep penetration, and a ſort of walking libraries; and although they are poſſeſſed of only a very minute or abſtracted portion of whatever

whatever is the ſubject of converſation, they engage in the argument in very general terms, always taking care not to advance too far, and to retreat in time; which they do in a manner, as if they were tired of talking further upon the queſtion at preſent, and therefore would be glad to poſtpone it, to be diſcuſſed more at large another time. In reality, they have ſaid all they know, but behave in this manner, in order to have it thought they have only given a ſmall ſpecimen of their knowledge of the thing; although, like the painter who undertook to paint the eleven thouſand virgins, but never finiſhed more than five of them, and declared that all the reſt ſhould be ſuppoſed coming behind in proceſſion, they would be glad, that what they have already ſaid ſhould conclude the debate; ſtill, if any one, aware of their tricks, ſhould then preſs them to a further diſcuſſion of the point, they either artfully turn the converſation, or affect a ſcornful diſlike to diſcuſſing ſo weighty a matter before ſo thin an audience; or elſe get rid of the invitation made to them, with a diſdainful ſmile, and treat both the propoſal and the propoſer, as if they were beneath their notice. Theſe people are very ready at ſuch ſort of expedients, becauſe they ſtudy them much, and have a great deal of practice in them.

XII. There are others again, who have recourſe to ambiguous and confuſed expreſſions; which ſeem to ſay a great deal, when in reality they ſay nothing; and which, like the anſwers of the oracles of old, are applicable to all kinds of events. In fact, they may be termed the images of thoſe oracles; for although they are liſtened to with attention, they are little better than mere ſtocks or ſtones. The obſcurity with which they talk is a dark ſhade, that conceals what they are ignorant of; and they make uſe of the ſtratagem of thoſe who have no other but falſe money; that is, take care to paſs it off under the cover of the night. But notwithſtanding all theſe glaring appearances, there are not wanting weak people, who eſteem their embarraſſment and confuſion as marks of their learning, and who think, that men are like mountains, which the more elevated and ſublime they are, the more liable to be covered with clouds, and to cauſe dark ſhades which obſtruct the fertility, and obſcure the chearful appearance of the vallies.

Majoreſque cadunt altis de montibus umbræ.

XIII. This deception, is commonly kept up and aſſiſted by a perſuaſive carriage, and by certain myſterious geſtures and diſtortions of the features;

features; ſuch as wrinkling the forehead, knitting the eye-brows, rolling the eyes, ſwelling out the cheeks, thruſting forth the under-lip, and ſhaking the head; all which affected tokens of wiſdom and importance, are diſplayed and accompanied, with a kind of diſdainful countenance. Theſe are a ſort of men, who have more than half the wiſdom they ſeem to poſſeſs lodged in their features and muſcles, which ſerve them to exhibit and expreſs theſe ſymptoms of profundity. Tully very juſtly ridiculed this artifice in Piſon in the following words: *Reſpondes, altero ad frontem ſublato, altero ad mentem depreſſo ſupercilio, crudelitatem tibi non placere.*

SECT. IV.

XIV. Men, by affecting to deſpiſe others who know more than themſelves, make uſe of the moſt vile and mean artifices imaginable; but notwithſtanding this, it is the moſt ſure method, to make them paſs for perſons of great knowledge, among people of groveling and plebeian minds. There can be no greater injuſtice committed, nor a vainer effort made, than that, of an envious man's attempting to transfer the merit which he has purloined from another perſon to himſelf. It is true, that a ſmall cloud may obſtruct the ſplendor of the ſun; but this

obſtruction does not prevent this luminary from being the illuſtrious torch of heaven, nor can ſuch a circumſtance be of more conſequence than a ſpeck in the atmoſphere; nor does it require any ſcience or learning, to enable a man to caſt a thouſand reflections and blemiſhes upon other people's doctrines and writings. When there is no reaſon to conclude that ſuch behaviour proceeds from envy or malevolence, we ought to ſuppoſe that it ſprings from pure ignorance. I remember to have read in a Treatiſe intitled The Man of Letters, written by Father Daniel Bartoli, that an aſs once happening to ſtumble over the Iliad of Homer, he in a paſſion tore it to pieces with his teeth. Thus, in order to outrage, abuſe, and deſtroy a noble writing, nothing is better qualified than a beaſt.

XV. Being tenacious, inſolent, and overbearing in argument, is alſo another means, which, although it is equally baſe and bad with the beforementioned, is ſometimes very efficacious to gain a perſon the reputation of being a learned man.—Fooliſh people, ſuch as the Megalopolitans, of whom we have an account in Pauſanias, pay greater veneration to Boreas the god of the north-wind than to any other deity, and are apt to adore tumultuous geniuſes as beings of ſupreme intelligence; and although it is abſolutely irreconcileable and incompatible with it,

to

to look upon barefaced arrogance as the child of ſuperior learning. To this we may add another thing, that may have an effect to make them paſs for wiſe and able perſons, which is, that thoſe who are truly learned, avoid as much as poſſible, all controverſy or diſpute with people who are of this tenacious overbearing diſpoſition; and this prudent declining to contend with them, is often conſtrued into fear of engaging them; as if it was neceſſary for men of learning, in order to ſhew their ſpirit, to encounter reptiles and venomous ſnakes. Cato's lamentation, or repentance, was juſt and generous, when he regretted having led his troops into the burning deſerts of Africa, where they had no other enemies to encounter but aſps, horned ſerpents, vipers, fiery ſerpents, and baſiliſks. The horrors of the civil war in the plains of Pharſalia, where they engaged the invincible troops of Cæſar, appeared to him leſs frightful, than thoſe they experienced among the burning ſands of Libya, where the moſt vile and abominable reptiles fought on Cæſar's ſide,

Pro Cæſare pugnant
Dipſades, et peragunt civilia bella Ceraſtæ.

XVI. He who can reconcile it to himſelf, to be inflexible in argument, and to diſpute without end, and with all his might, never ſuffering himſelf to be convinced by reaſon, has made a large ſtride towards being reputed an Ariſtotle among

the vulgar; for they, with reſpect to the wars of Minerva, as well as thoſe of Mars, are apt to declare the victory, in favour of him who remains longeſt in the field, and, in their opinion, he never fails to come off conqueror, who has the laſt word. This is the way the vulgar judge; but he who would be thought ſuperior to that claſs of people, muſt permit himſelf to be convinced by reaſon, for, if he does not, inſtead of acquiring the reputation of a learned man by ſuch conduct, he lets himſelf down to the level of a brute.

The ingenious Doctor Luis Rodriguez, being aſked what ſort of a man a ſhallow phyſician was with whom he had been arguing, anſwered pleaſantly, (although we muſt allow his wit ſavoured of the arrogance which is rather too common with the Portuguese) *He is ſo great an aſs, that goad him ever ſo much, it is impoſſible to make him get on, or be the better for any reaſoning that is beſtowed on him.*

XVII. It is alſo a very common artifice with thoſe who know but little, to bring the converſation to turn upon that little they are informed of. This is very eaſy for people of power or authority to do. I knew a perſon of this ſort myſelf, who, whatever converſation happened to ariſe in company, was uſed to train the ſubject of it inſenſibly, to fall on the few points relative to it, which he had been reading or ſtudying that

day, or the day before, by which piece of management, he generally uſed to appear more learned than the reſt of the company. Even in ſcholaſtic diſputes, this art is often practiſed. I have more than twice in my life, ſeen a good theologian foiled by a novice; who, by artfully ſliding ſome chimerical propoſition into the diſpute, has drawn the argument from its proper object, and cauſed it to fall into a ſumuliſtical labyrinth of amplifications, reſtrictions, alienations, oppoſitions, converſions, and equipolations; the rules of which were freſh in the young man's memory, and which the old theologian had forgot. This was adopting the craft of the rogue Cacus, who, having artfully drawn Hercules into his own cave, rendered his arms and ſuperior ſtrength of no uſe to him, by blinding him with the ſmoak he contiuned to eject out of his mouth.

SECT. V.

XVIII. Beſides the viſionary wiſe people, or thoſe which are ſuch in appearance only, there are others who have credit given them for being men of profound knowledge, merely from the miſtakes and miſapprehenſions of others. He who ſtudies logic and metaphyſics in the ſchools,

together with thoſe other matters, which under the denomination of philoſophy are taught there, notwithſtanding the ſounding names, of theſe faculties, and his being ſuppoſed to know every thing, in reality, knows but little more than nothing. It is commonly ſaid, that ſuch a man is a great philoſopher, when in truth he is no philoſopher at all, either great or little. All the ten categorical principles, together with the whole contents of the eight books on phyſics, and their two adjuncts *on generation and corruption*, put into a logical alembic, would not produce a drop of true philoſophical ſpirit, that would aſſiſt us to explain the moſt vulgar phenomenon in the ſenſible world. The Ariſtotelic ideas, have no more to do with phyſics, than the Platonic ones; and the phyſics of the ſchools, are pure metaphyſics. All that the Peripatetics have hitherto written or diſputed concerning motion, has not determined, what is the line of reflection, by which a ball returns back that is ſtruck againſt a wall, or what is the degree of velocity, with which a heavy body deſcends by an inclined plane. He who by the ordinary metaphyſical reaſonings, thinks to attain a true knowledge of nature, is as mad, as he who ſhould fancy himſelf maſter of the world, becauſe he is poſſeſſed of a map of it.

XIX. The

XIX. The great advantage of theſe philoſophers in name, if in the ſchools they manage with dexterity the rules of ſcience, conſiſts in this, that in virtue of the four ſpecies or rudiments of theology or medicine they acquire there, they are enabled to dazzle the eyes of mankind, and to paſs in the world, for great theologians and doctors of phyſic. With reſpect to theology, the miſtake in this matter is not ſo great; but with regard to medicine, it cannot be greater. By the rule, *Ubi deſinit phyſicus, incipit medicus*, it ſeems as if it ſhould follow of courſe, that a good philoſopher is eaſily made a good doctor of phyſic. Upon this ſuppoſition, when people ſee a practiſing phyſician, who has twenty ſyllogiſms at his fingers ends, ready to explain and demonſtrate, whether privation is a principle annexed to a natural entity, or whether the united maſs or the whole, can be of a diſtinct or different texture from the parts, they fancy he is poſſeſſed of all the requiſites and recommendations, that are neceſſary to eſtabliſh and fix him as a moſt able, or firſt rate man in his profeſſion.

XX. That moſt learned commentator upon Diſcorides, Andrew de Laguna, ſays, that if it could conveniently be done, it would be good policy to ſend thoſe flaming young phyſicians, who are juſt

juſt come from the univerſity, brimful of the bragadocio arrogance of *ergo* and *probo*, to practiſe phyſic in thoſe nations we are at war with, for that it would be attended with a great ſaving, both of men and money, to our own country.

XXI. I can with confidence affirm, that there is no art or faculty, that can be leſs conducive to the acquiſition of medicinal knowledge, than the phyſics of the ſchools. If all the philoſophers that are, or ever were in the world, could be convened together, and remain in conſultation for a hundred years, they would not in all that time, by the mere help of philoſophical ſpeculations, be able to inſtruct us how we ſhould cure a chilblain; nor from that tumultuous conſultation, ſhould we obtain any maxim, that ought not to be prohibited as contraband, and refuſed admittance into the chamber of a ſick perſon. Good ſenſe joined to experience, either acquired by a man's own, or the practice of other reputable people, are both the father and mother of medicinal knowledge; nor has phyſics, that is to ſay the phyſics of the ſchools, the leaſt ſhare in the propagation of this ſpecies.

XXII. The reaſoning of naturaliſts upon all kinds of mixtures, conſiſts, in whether they are conſtituted

conſtituted of matter and ſubſtantial forms according to the doctrine of Ariſtotle, or of atoms according to that of Epicurus, or of ſalt, ſulphur, and mercury, according to that of the chymiſts, or of the three elements, according to that of the Carteſians: whether theſe are compoſed of undiviſible points, or of parts dividable *in infinitum*; whether their action or operation is from their texture, or the motion of their particles, or from ſome accidental virtues which they call qualities; whether theſe qualities are of the manifeſt or the occult kind; and whether they are of the firſt, ſecond, or third claſs or ſpecies. Now what has all this to do with medicine? I will venture to pronounce no more, or rather leſs, than it has with geometry or juriſprudence. When a phyſician goes about to cure a tertian ague, all this farrago of queſtions applied to the operations or effect of the bark, is of no ſort of uſe to him. The only thing that is of any importance for him to know, is, whether his experience has taught him, that in the preſent ſtate of the diſorder, it will be proper to adminiſter this febrifuge; but this he is to infer, not from the maxims, *dici de omni*, *dici de nullo*; but from conviction, drawn from experiments he has made himſelf of its efficacy in the like caſes, and alſo from thoſe, which have been

been made by phyſicians of eminence who have wrote on the ſubject.

XXIII. In no art whatever, is it of any uſe, to have a phyſical knowledge of the implements, with, or by which, a man does his buſineſs. A man may be an excellent pilot, without being able to explain the directive virtue of the load-ſtone to the pole; and a great ſoldier, although he is totally ignorant of the phyſical component parts of gunpowder, and the metal with which military implements are made; and he may be a great painter, without knowing whether colours conſiſt of intrinſic accidents, or whether they are produced by the various reflections of light. Nor does the being able to argue well upon theſe points, conduce in the leaſt degree, to make a man either a pilot, a ſoldier, or a painter. But there is no neceſſity for my enlarging further, in order to extirpate this common error from the world, as the learned Doctor Martinez, has fully and effectually exploded it in his two volumes, intitled Medicina Sceptica.

SECT. VI.

XXIV. There is another common error reſpecting the ſubject-matter of this Eſſay, although the opinion built upon it, is rather better founded than the

the one we have juſt been ſpeaking of, and that is, looking upon every man as wiſe, able, and ſkilful, who has ſtudied a great deal. The labour of ſtudy, ſeldom makes any great improvements, if it is not beſtowed on a clear and penetrating natural underſtanding; and may be compared to the toils and expences of cultivation, that are employed upon a poor and nearly barren ſoil, which ſeldom produce much fruit. Among mankind, are to be found the turtles and the eagles of the human ſpecies. The laſt, with a ſpeedy and eaſy flight, aſcends to the ſummit of Olympus; the firſt, after ſeveral days labour, ſhall not be able to reach to the top of a moderate hill.

XXV. Much time employed in reading, furniſhes a man with a deal of matter; but the being able to penetrate, or rightly comprehend that matter, is more a gift of nature, than a production from toil. There are ſome, who may be termed lerned from their memories, but who are not ſo in virtue of their underſtandings, and who may be compared to marble tablets with inſcriptions engraved on them, which diſplay the letters, but do not perceive them. They are a kind of mental books, that are filled with many texts, which they no more comprehend, or have a right idea of the meaning of, than the leaves on which

they are written. If you obſerve the uſe or application they make of the ſpecies they have acquired, you will perceive, they deduce no proper concluſions from what they have read, nor make any obſervations on the things they have been peruſing, that are pertinent or applicable to the ſubject-matter of thoſe things. Thus we ſee, that from the ſame ſpecies or ſet of ideas, may be formed good reaſoning and bad; juſt as with the ſame ſort of materials, you may build elegant palaces, and ruſtic habitations.

XXVI. Thus it may alſo happen, that a man ſhall know all the works of Saint Thomas by heart, and be a very poor theologian; and that he ſhall in the ſame manner, know all the ſtatutes of the civil and canon law, and be a very bad lawyer. And although it is commonly ſaid, that law-knowledge depends almoſt intirely upon memory, or at leaſt, that it depends more upon memory than underſtanding, but I conſider this as another common error. With a great many law-caſes and maxims at his fingers ends, a man may draw a very bad plea; in the ſame manner as one, although his memory is ſtored with a vaſt variety of texts of ſcripture, may make a very bad ſermon. The choice of the moſt fit to apply to the ſubject, depends upon the underſtanding, and not upon the memory. If men were obliged

obliged to do law-buſineſs by ſurprize, and without having time to conſider and digeſt what they were about, a happy memory, in which were treaſured up pertinent texts and citations, would be a moſt eſſential ingredient, and one, that it is almoſt indiſpenſably neceſſary they ſhould be poſſeſſed of. But as this, in the regular courſe of practice, is not the caſe; he who has attended properly to the beſt books that have been written on the profeſſion, and has a good general idea of them, will ſeldom be at a loſs where to look for apt caſes and authorities, wherewith to ſupport his arguments; and as I obſerved before, the choice of thoſe which are the moſt conducive to this end, is more the buſineſs of underſtanding, than memory.

XXVII. I have obſerved, that profeſſional people in all faculties and ſciences, have a great propenſity to complain of the want of memory, and I have alſo obſerved, that they are apt to ſet a much higher value upon the gift of memory, than the power of reaſoning; ſo that it appears to me, that if there were to be two ſhops opened, in one of which was ſold memory, and in the other underſtanding, the man who kept the firſt would ſoon make a fortune, and he who kept the ſecond, would not take as much money as would buy him ſalt to his porridge. But my opinion,

opinion, was always quite different from this common notion, and I can ſay for myſelf, that I ſet more value upon a drachm of underſtanding, than upon an ounce of memory. I have been told, that I do not eſtimate memory at a high rate, becauſe I have no occaſion for it; but it is poſſible that thoſe who told me this, may judge of me by themſelves, who are not anxious about an increaſe of talents or ingenuity, becauſe they fancy they are abundantly provided with all they ſtand in need of. I would not pretend to be endowed with a great ſhare of memory, but I however think, I am rather better furniſhed in that reſpect, than I am in point of underſtanding; but I do not ſet a greater value on the laſt of theſe faculties on that account, nor does it proceed from my being anxious of an increaſe of it to myſelf, that I ſet a higher value upon underſtanding, than I do upon memory; but I give this preference from a perſuaſion, that in all the ordinary occurrences of life, underſtanding will afford a man more aſſiſtance, and be of infinitely greater uſe to him than memory.

SECT. VII.

XXVIII. We have not as yet, ſaid any thing of authors or writers; but this ſemblance of learning,

learning, is the eaſieſt to put on of all others. There is no more difficulty in writing ill, than there is in talking ill; and provided a man writes in the *bon ton*, and can flouriſh with the king's licence in the front of his work, the book will go off, and the author will paſs with the ideots of the world, for a learned, and an able man.

XXIX. But a perſon may make ſure of gaining applauſe as an author with the generality of mankind, and this may be done in two ways, either by filling his writing with common-place obſervations, and juſt taking care to diverſify and ſcatter them about; or elſe by ſtealing from other authors; and where there are great numbers of books to have recourſe to, the danger of being detected in the plagiary is not very conſiderable; for there are very few who read many books, and nobody can read all that are publiſhed; ſo that all the hazard a perſon runs of being found out, is, that here and there one out of many thouſands of readers, may diſcover from whence he made the theft; and among all the reſt, he would paſs for an original author, and they would acknowledge and reſpect him as ſuch.

XXX. The writing from alphabetical compilations is alſo extremely eaſy. There is the

Theatre of human life, the Polyantheas, and many other books, where erudition is arranged under the initial letters of the ſeveral branches of learning, and theſe books, by having copious indexes annexed to them, become a kind of public fountains, where all the animals of the world may drink, both men and beaſts. Whatever ſubject a man undertakes to write upon, be it politics, morality, humanity, or hiſtory, he has only to turn to the index, which will point out to him, where he may be furniſhed with a copious aſſortment of texts, and citations, that are amaſſed together in theſe books for the uſe of all the world, and where he may collect whatever he has occaſion for. By this management, the new author may gain himſelf the reputation of a man of great erudition and reading; for there are very few who can diſtinguiſh by the connection and regular ſeries of a writing, that kind of copious erudition, which is well arranged and properly ſeparated in the brain, and which flows opportunely from thence to the pen; from that, which a man when he is hard put to it, is obliged to collect from indexes and common-place books, with which he ſwells his work, and with which he heaps up in it, groſs and bulky trifles, that conſiſt of ſtraw and chaff, collected from common-place Latin citations and numbers.

MORAL

MORAL AND POLITICAL PARADOXES.

PARADOX I.

The Invention of Gun-powder has been of great Use, and also very beneficial to Mankind.

I. IF in the account which Virgil gives of the descent of Æneas into hell, he points out, as one of the most tormented and afflicted he saw there, Salmoneus that king of Elide, who in order to acquire to himself divine honours, attempted to imitate, although it was but in a very poor way, the thunder and lightning of Jupiter;

Vidi, & crudeles dantem Salmonea pœnas,
Dum flammas Jovis, & sonitus imitatur Olympi.

I say, if this was the case of Salmoneus, I believe I may venture to pronounce, that the bulk of mankind, would judge the man deserving a much more severe punishment, who invented gun-powder, and contrived cannon, and would think,

that he had imitated much better than the king of Elide, the noiſe, the flaſh, and the havoc made by thoſe fiery flying meteors. In truth, the world contemplate the Author of that invention with ſuch horror and indignation, that they deteſt his name. And Quevedo ſpeaks the ſentiment of them all, or they nearly all aſſent to the opinion he expreſſed of him, in the following lines:

He was of iron race and heart,
In concave metal vaſt machine,
Who firſt combuſtible with art
Did ſhut;
And then to raiſe a horrid ſcene,
By violence produc'd a flame,
Deſtructive as his ſavage mind,
And thus transferr'd his odious name
As infamous to all mankind.

II. This abomination of the inventor, ariſes from the world's conſidering the invention of gun-powder, as a moſt pernicious thing to the human race, as in conſequence of it, the number of violent deaths has been greatly increaſed; but this is an error, which in the diſcuſſion of this Paradox I propoſe to baniſh from the world; and do not doubt, that by the help of a little reaſoning and reflexion, I ſhall be able ſo to explain the matter, as to cauſe the miſtake to vaniſh.

III. So

III. So far is the common conjecture, that the invention of gun-powder has increaſed the mortality of mankind, from being true, that on the contrary, it has leſſened it. It is a notorious fact, eſtabliſhed upon the faith of all antient and modern hiſtories, that when they only uſed what are commonly called white arms in war, the battles were much more bloody than they are at preſent. It was very rare then, that the diſpute was decided, when the conteſt lay between troops that were nearly equal in valour and diſcipline, till one of the parties were almoſt half deſtroyed; but at preſent, inſtead of that, the death of a tenth part, is generally ſufficient to determine the victory in favour of the conquering ſide. I confeſs, that this in ſome meaſure may be owing to the ſuperior perfection the art of war is arrived at now, compared with what it was formerly. I ſay in ſome meaſure, becauſe I apprehend the greateſt difference, ſhould be imputed to the different way of fighting. In former days, when they fought principally with ſwords, or cutting and thruſting weapons, the troops could not engage, without being intimately mixed one with another. This mixing, conduced to irritate men's minds, and cauſed a greater difficulty in diſcerning the advantages one army had gained, and the diſadvantages the other laboured under:

it alſo created great confuſion, and made it difficult for them to attend to or obey orders; and likewiſe made it very hard to withdraw the vanquiſhed out of the reach of the conquerors; all which cauſes, concurred to make battles very obſtinate and bloody. Now-a-days, it is ſometimes ſufficient to decide the conteſt, if one of the parties before their coming very near each other, is greatly diſordered by the fire of their adverſaries; in which caſe, if the general upon weighing the circumſtances, concludes he cannot repair the miſchief, he orders a retreat.

IV. In the ſieges of fortified towns, this difference of bloodſhed is ſtill greater; for the reduction of places, is become much more eaſy by the invention of gun-powder, and the ſlaughter attending reducing them greatly leſs, than it was before the uſe of it. The ſiege of Troy, which we are told laſted ten years, would probably not have continued two months, if they had then known the uſe of cannon and mortars; by ſo much the more havoc theſe implements make of the ſtone-walls, by ſo much the leſs, is the havoc made of men's lives. Bombs and cannon-balls, are more terrifying than deſtructive. All hear their noiſe, and but few periſh by their flaſh. Frequently, the ſurprize and panic they occaſion, redeem people from the miſchief of them, becauſe

becauſe the garriſon, by being intimidated before they are conſiderably waſted, entertain thoughts of ſurrendering; by which means, an infinite number of deaths, both on the part of the beſieged, and the beſiegers, are prevented.

V. It has not only been obſerved, that there has been a ſaving of men and time in ſieges, ſince they have introduced carrying them on by artillery; but it has alſo been remarked, that in proportion as the fire of them has been augmented, the deſtruction of the human race has been leſſened. Upon this experience, and with a view of preventing the effuſion of blood, Louis the fourteenth during his reign, either from his own feelings, or by the advice of his beſt officers, directed, that they ſhould increaſe the expence of gun-powder in ſieges. And Spain once imitated this practice very happily, and with great ſucceſs; for having obſerved that the ſiege of the town of Namur in 1695, on account of the ſmallneſs of their fire, coſt them much time, and a great number of men, before they could reduce the place; therefore when they came to beſiege the citadel, they for the ſpace of ſeven days, kept an inceſſant fire againſt it, with a hundred and forty cannon, and a hundred mortars and royals; by which means, they obliged it to ſur-

render in much leſs time than they ſpent in beſieging the town, and when the garriſon conſiſted of eight thouſand good troops able to do duty, excluſive of ſick and wounded. It is a fact, that this good purpoſe was attained upon that occaſion, and would no doubt be attained upon others of the ſame ſort, not only on account of the terror, which ſuch a fire impreſſes the beſieged with, but becauſe alſo, the continual fatigue it expoſes them to, exhauſts their ſpirits, and does not permit them, either to eat or ſleep in ſafety, and obliges them to exert an almoſt continual bodily labour, in repairing the breaches, and clearing the ditches of the rubbiſh that is beat down into them, and alſo in tranſporting materials to make breaſtworks at the places attacked, together with ammunition and other things. Where the garriſon is not compoſed of veterans, the terror occaſioned by the noiſe of ſo many cannon and mortars, joined to the tumbling of the edifices, is ſufficient to intimidate, and frighten them into a ſurrender. And the ſame thing will happen, when there are a great number of inhabitants ſhut up in a place, although the garriſon ſhould be a veteran one; as we are informed by that great maſter in the art of war, the Marquis de Santa Cruz de Mercenado, in the fifth book of his Military Reflexions.

VI. It being then certain, that gun-powder has prevented the loſs of a great many lives in war, the miſchief that has happened from it is very light, compared to this great advantage, nor is the evil of its affording people the means of putting one another to death, to revenge private grudges, to be compared with this benefit; for ſuch misfortunes do not amount to a thouſandth part of the other advantages. Nor ſhould all the deaths that happen in that way, be charged to the account of gun-powder; for the ſteel in moſt of theſe caſes, is commonly the inſtrument of vengeance, and there are many of theſe contrived very artfully, for the purpoſe of giving deſperate wounds to people when they are off their guard. To this we may add, that rigorous laws againſt peoples carrying concealed piſtols, may in a great meaſure, prevent theſe cruelties from being perpetrated by the means of gun-powder; ſo that by making a general computation, of all the good and bad reſulting from gun-powder in theſe reſpects, we ſhall find, that for one man that is ſlain by it in conſequence of private piques and quarrels, the lives of a thouſand are ſaved, that would otherwiſe have been loſt in the diſputes between princes.

VII. If

VII. If we conſider powder with regard to the advantages we derive from it in other reſpects, we ſhall find it to be very uſeful and beneficial to mankind, for it aſſiſts us to kill game, to extirpate wild beaſts, to ſmooth rugged ſurfaces, to blow up lime-ſtone, to open paſſages through craggy mountains, to ſtop the progreſs of fires, and is likewiſe uſeful in a thouſand other inſtances.

VIII. From all which it may be inferred, that the inventor of gun-powder, inſtead of meriting the execrations that are fulminated againſt him, is deſerving of the thanks and applauſe of the world. Who this inventor was, agreeable to the general opinion, may be ſeen in the twelfth Diſcourſe of the fourth volume of the Theatrico-Critico *.

* The tranſlator thinks, as he has not tranſlated that Diſcourſe, it will not be amiſs to inſert here the Author's ſentiment on this ſubject. In the Eſſay or Diſcourſe referred to, after reciting the arguments that have been uſed to prove the invention came from China, and the claims that have been made on the behalf of a variety of people, to their being the inventors; he gives it as his opinion, that Bertoldus Schuvart, a German Franciſcan friar, and an eminent chemiſt, was the man who invented it, or at leaſt was the perſon who brought the invention to perfection.

PARA-

PARADOX II.

What is commonly called Clemency in Princes and Magiſtrates, is pernicious to the Public.

IX. Clemency, as it is explained by Moraliſts and Theologians, is a virtue; but as underſtood by the vulgar, it is a vice. This different acceptation of one and the ſame word, may be eaſily accounted-for. If we advert to the doctrine laid down by St. Thomas, we ſhall there find, Clemency explained as not inconſiſtent with ſeverity. But I aſk whether in the idea of the vulgar, theſe two qualities are not very different? They are clearly ſo; becauſe that which is termed ſevere, they without the leaſt heſitation deny can be clement. Therefore the ſignification which the vulgar give to the word Clemency, is different from that which is given to it by learned and wiſe men.

X. Severity then in the opinion of theſe laſt, is an habitual inflexibility of the mind, which will not relax in the puniſhment of crimes, whenever the dictates of right reaſon require they ſhould be puniſhed. Clemency alſo, as explained by them, is an habitual diſpoſition to leſſen the puniſhment of crimes, whenever the ſame right reaſon dictates that they ſhould be leſſened; *Quando oportet, et in quibus oportet*, ſays the angelic doctor,

and it is from his doctrine that this definition is taken. It is clear, there is no oppoſition, but rather an agreeable harmony between theſe two qualities; and it is alſo clear, that the vulgar look upon that inflexibility of the mind in which ſeverity conſiſts, as diametrically oppoſite to clemency; and thus they call obdurate, rigorous, inexorable, and auſtere, all thoſe, who poſſeſs that inflexible habit.

XI. That prince or magiſtrate is clement in the opinion of the vulgar, who is to be wrought upon by the intreaties of friends, the tears of the guilty, and the cries of his orphan family; and who indulges the ſoftneſs of his own diſpoſition, and is induced from theſe motives, to mitigate the puniſhments, which the law has allotted to crimes. But in reality, this is not Clemency, but injuſtice. It is rather a vileneſs, and a weakneſs of mind, which is cloaked under the name of Clemency. He is a protector and an encourager of wickedneſs, who from ſuch conſiderations, and without any other motives, ſlackens his hand in the puniſhment of crimes. He is an indirect tyrant of the ſtate, and becomes an abettor of all thoſe evils, which are occaſioned by the daring raſhneſs of delinquents; and he is alſo a multiplier of them to an exceſſive number, by his forbearing to deter bad men from committing

ting them by proper examples; and it is for this reaſon, that we ſaid in the title of this paradox, that that which is called Clemency in princes and magiſtrates, is prejudicial to the public at large.

XII. Who then ſhould be deemed truly clement? Why he who after duly weighing and conſidering all the particulars and circumſtances of a caſe, is convinced by the dictates of right reaſon, that he ought to leſſen the puniſhment aſſigned to a crime by the common law, and does leſſen it in conſequence of ſuch a conviction. This is all agreeable to the doctrine of St. Thomas before quoted; and from hence it may be inferred, that the exerciſe of clemency can never be arbitrary, as is generally imagined. I mean, that the leſſening a puniſhment which the law preſcribes for a guilty perſon, can never be ſuppoſed to depend upon the mere will of a prince or magiſtrate. He ought only to leſſen it, when he finds after maturely weighing the circumſtances, that it ſhould be leſſened, for if they would not juſtify his doing it, he ſhould not leſſen it at all. There is no middle way. Clemency is a moderating virtue, which if exerciſed with exceſſive zeal may become vicious. I am very well aware, this is giving much leſs extenſion to the virtue of clemency than the general opinion allows to it. But that is nothing to the

the purpoſe, for this is the true and ſound doctrine reſpecting it.

XIII. The juſt motives for leſſening puniſhments in various caſes, are many; for example, the antecedent merits of the convicted perſon, the uſe he may be of to the public, his known ignorance of the conſequence of what he did, or his having committed the crime inadvertently; any ſerious inconvenience that might reſult to the public from his puniſhment; or any convenience that might be derived to the ſtate from moderating it, &c.

XIV. That great Aſturian hero, Pedro Menendez de Aviles governour of Florida, acted on various occaſions, and in matters of the utmoſt importance, contrary to the orders that had been given him by the king. For each of theſe tranſgreſſions, according to the ſtrict letter of the law, he deſerved to be puniſhed capitally. The king, and a king who was ſo zealous of his authority as Philip the ſecond, pardoned them all; but not totally, for we may eſtimate as a partial puniſhment, his delaying ſo long to confer on him the rewards due to his ſignal merits, during which interval, that eminent man experienced not a few pinchings and inconveniencies. The king acted clemently by proceeding

proceeding in this manner; for it would have been unjuſt, cruel, and ſavage in many reſpects, if he had adhered to the letter of the law in puniſhing him. The ſtate would have loſt a moſt profitable ſubject, ſome ſignal merits would have gone unrewarded, and ſo ill judged a precedent, would have been productive of great diſadvantages to the public, becauſe other commanders, who might afterwards find themſelves in circumſtances where ſtrictly obeying their orders would be attended with pernicious conſequences, would obey them notwithſtanding, for fear of the puniſhment. Even without the aſſiſtance of ſo bad a precedent, that dread, occaſioned the ruin of the grand Armada, fitted out by the ſame king Philip for the chaſtiſement of England.

XV. I ſuppoſe, that Peter Menendez, having always been ſucceſsful when he acted contrary to his orders, conduced much to excite, if it was not the ſole cauſe of the king's lenity and benevolence to him. But even the plea of this merit, was of no avail to that valiant youth the ſon of Manlius Torquatus, who after returning home victorious and crowned with laurels, was by order of his own father put to death, for having contrary to his orders, fought with, and defeated his enemies. This was acting with improper

proper ſeverity, for although the offence by the ſtrict letter of the law, ſhould have been puniſhed capitally, the putting him to death was ſavage, cruel, inhuman, and barbarous. The ardour and fire of his youth, ought to have been admitted as a plea to mitigate his fault; but there was much more room for ſhewing lenity to him on account of the zeal he manifeſted for the public good, by taking the advantage of a favourable conjuncture, which it was impoſſible for the Conſul to foreſee when he gave him his orders, and thereby, doing ſo eminent a ſervice to his country. But the ferocious and ſour virtue of the obdurate Manlius, neither weighed circumſtances, nor attended to, or was influenced by the dictates of morality; and thus, he unjuſtly deprived his country of the life and ſervices of a youth, who gave the moſt promiſing hopes of his becoming one day a great commander.

XVI. When the circumſtances of a caſe do not afford juſt motives for departing from the letter of the law, there is no room for the exerciſe of clemency; as the departing from it in ſuch an inſtance, would be injuſtice, and it is impoſſible that the ſame action, ſhould be conformable to one virtue, and contrary to another, becauſe at that rate, it might be both good and bad

bad at one and the ſame time. Thus in theſe caſes, there is no other courſe to take, but that of applying the puniſhment the law preſcribes, without regarding the clamours of weak-minded people, who are capable of cenſuring ſuch conduct as over-ſevere or harſh; for acting in this manner conduces to the public good.

XVII. Annon, the pious archbiſhop of Cologne, did, in the eleventh century, cauſe the eyes of ſeveral of his judges to be put out, for having given an unjuſt judgment againſt a poor woman; but he left one of the number with a ſingle eye, in order that he might be able to lead the others about. I ſuppoſe that ſuch an example, could not fail to fill the whole city with horror; but although many might exclaim againſt the cruelty of it, it was ſtill juſt and uſeful, as the blinding of thoſe few judges, might contribute to open the eyes of an infinite number of others, and cauſe them to look attentively, how they pronounced ſentences in future.

XVIII. The caſe I am about to mention, is more ſingular ſtill: when Count Evkembaldus the ſovereign of Burdan, was in a very weak and infirm ſtate, a complaint was preferred to him againſt a nephew of his, who had violated the chaſtity of a young lady, and upon the charge being clearly proved againſt

him, he, as he was a zealous lover and aſſertor of juſtice, ordered him to be put to death; but thoſe who were directed to execute this ſentence, evading doing it, upon a ſuppoſition that the Count muſt ſoon die, ſomebody informed him of the omiſſion; and as he ſaw clearly that in his preſent weak ſtate, although he ſhould repeat his orders, they would not be executed, he artfully contrived, by declaring that his indignation againſt the youth was appeaſed, and that he was diſpoſed to forgive him, to get him brought into his ſick room, where coaxing him under ſome pretence to approach his bed, he ſeized him by the collar with his left hand, and with a poignard that he held concealed in his right, ſtabbed him into the throat, and killed him on the ſpot. Many ſeemed ſcandalized with this act; but there is no reaſon to ſuppoſe, that it was diſpleaſing in the eyes of God.

XIX. This inviolable integrity in the adminiſtration of juſtice, is no indication of obdurateneſs, but is rather compatible, with the greateſt tenderneſs and compaſſion the human heart is ſuſceptible of; although, where effective clemency cannot be admitted, there may be room for the introduction of the affective.

Briante Prieneus, one of the ſeven wiſe men of Greece, was obſerved to weep very bitterly after

after condemning a guilty perſon to death; upon which, ſomebody preſent aſked him why he lamented, ſince it was in his own power to pardon the man; to this he anſwered, *You miſtake, for it is by no means in my power, and therefore I weep. His life is a debt that is due to juſtice, and this tenderneſs of mine, one that I owe to nature.* It is ſaid of Veſpaſian, that he frequently wept and lamented in tears, the deaths of guilty perſons, whom he himſelf had juſtly condemned.

XX. To him who has a heart ſo delicate, that the gentleneſs of his diſpoſition is apt to degenerate into weakneſs and debility, I will preſcribe an admirable remedy, which ſhall comfort and ſtrengthen his heart, and not leſſen or abate its ſoftneſs. This conſiſts, in directing his attention to contemplate another object, and in making that the object of his compaſſion. Let us figure to ourſelves a judge, at the criſis when he has juſt paſſed ſentence of death on a notorious rogue, who has been guilty of many cruelties and outrages, and when he is aſſailed with the cries and intreaties of the convict to be merciful to him; and let us alſo conſider him, when thoſe intreaties are afterwards repeated with the enumeration of all thoſe particulars, that are moſt likely to excite tenderneſs and compaſſion, ſuch, as imploring him to commiſerate his diſ-

treſſed wife and children, and to look with an eye of pity, on the miſerable and afflicted ſtate of an unhappy man, who is all contrition and repentance, and whoſe ignominious death, will bring diſgrace and affliction on his innocent friends and relations. Upon hearing this, he may be apt to ſay to himſelf, taking away the life of a man is a terrible thing, and may perhaps revolve in his mind, all the horrors of a perſon leading to execution, and alſo thoſe he may feel, when he is juſt on the point of ſuffering the puniſhment he has been condemned to by the law. Theſe reflections may poſſibly ſtagger his conſtancy, and diſpoſe him to pardon the offender.

XXI. But if he would turn the eyes of his underſtanding from contemplating this tragical picture, and view another, which is much more tragical, and which is drawn and depicted from the circumſtances that appeared in evidence at the trial; he might there ſee repreſentations of cruelty and outrage in a variety of ſhapes, and diſtreſs and miſery of various kinds, which have been brought by the depredations of this ſavage fury, on numbers of innocent people, who are all then praying that juſtice may be done on this violator of the laws of God and man; this enemy to the peace, ſecurity, and happineſs of mankind.

mankind. When a judge contemplates ſuch things, ought he not to be more affected with the cries and lamentations of theſe ſufferers, than with the intreaties and affliction of a wretch, who has been the author of ſo many evils, and whoſe miſery and diſtreſs has been brought upon himſelf, by his own outrages and miſdeeds?

XXII. It may be replied to this, that theſe miſchiefs can't be remedied by the execution of the man, and that putting him to death, will be only adding a new tragedy to thoſe already exhibited; but have patience. Although it is true, that this will not remedy the miſchiefs that are paſt, it will deter others from committing the like offences for the future. The pardoning crimes, operates like a contagion; and the impunity of a delinquent, inſpires others with boldneſs, and infects them with the inclination of becoming delinquents alſo; on the contrary, by puniſhing ſuch a man, you ſtrike terror into ill-intentioned people, and prevent the diſtreſſes of thouſands; and although you can't remedy the misfortunes of the innocent perſons who have already been injured, you may prevent the like miſchiefs from being done to an infinite number of others, Let a judge now weigh all theſe things, and then determine, whether ad-

vancing the public good, and doing juſtice to theſe injured people, ought not more to excite his compaſſion, than that devil in human ſhape who awaits the execution of his ſentence; and finally, I muſt obſerve to him, that if he lets ſuch a miſcreant go unpuniſhed, thoſe very innocent people whom he has injured, will implore the juſtice of heaven againſt him for having pardoned ſo horrid a wretch.

PARADOX III.

What is termed liberality in princes, is for the moſt part injurious to their ſubjects.

XXIII. I conſider liberality, not only as a virtue, but as a moſt noble one, that is ſo much the more worthy to be treaſured up in the breaſt of a man, by ſo much the more his ſtation of life is exalted. It is certain, that although all vices are vile and baſe, and all virtues noble, there are vices, which in an eſpecial manner deſerve to be ſtigmatized with the epithet of foridid, and that there are virtues, which ſhine forth with a ſuperior ſplendor and dignity. Among the firſt ſort, avarice ſhould be claſſed, and among the ſecond, liberality.

XXIV. From

XXIV. From hence it may be inferred, that avarice, which is always a vile quality, in princes, is a ſuperlatively vile one, as this meanneſs of ſpirit, is unworthy of the elevated dignity of a throne. Veſpaſian was a prince of admirable endowments, he was a great warrior, politician, and magiſtrate, and was beſides temperate, diſcreet, and affable; but his avarice was a dark ſhade, which obſcured all theſe perfections; ſo that the moſt a perſon can do who reads his hiſtory, is not to abhor him, but he never can bring himſelf to eſteem or love him. He, to increaſe his revenues and fill his coffers, went to the extreme length, of laying a tax on the excrements of the human body; but the matter out of which the tax aroſe, was not ſo noiſome and ſtinking, as the tax itſelf.

XXV. Although, it does not follow from hence, that prodigality, which is a vice diametrically oppoſite to avarice, is not a great blemiſh in princes; for in truth, it is more blameable in them than in private people. A private prodigal, waſtes his own ſubſtance; a prince, the ſubſtance of other men. A private perſon by his extravagance, hurts himſelf; a ſovereign, by his, injures a whole community; ſo that, although the two vices are unlike in themſelves, when centered in princes, they produce with

reſpect to the public, the ſame effects. The avaricious prince impoveriſhes his people to enrich himſelf; and the prodigal one, impoveriſhes himſelf to enrich others. What the firſt heaps up, is buried; what the other amaſſes together, is diſſipated; and by attending cloſely to this object, you will find, that prodigality is the moſt pernicious vice of the two; becauſe what a prodigal ſovereign ſquanders in needleſs largeſſes to enrich particular people, does not return, or if ever it does, it is very late, or it is by ſome rare accident, that it ever returns again to the public ſtock; whereas what an avaricious prince hoards up, may be ſerviceable in the days of his ſucceſſor, and may greatly contribute to leſſen the burdens of his ſubjects.

XXVI. But how ſhall we define what ſhould be termed prodigality in princes? Why by calling all that ſuch, which is commonly ſtiled liberality. The vulgar, and even thoſe who are ſuperior to the vulgar, allow of a large extenſion, to the arbitrary and voluntary expences of princes. It is commonly underſtood, that when a prince from caprice, or from particular affections for a ſubject, makes him a preſent, that the donation ſhould be proportioned to the power and grandeur of the perſon who beſtows it; but I conſider the thing in quite a different light.

light. Whatever conſiderable ſum of the public money is expended, which is not laid out, directly or indirectly, to advance the public benefit, is injuſtice and profuſion. That which comes out of the pockets of the public, ſhould be expended in ſuch things as are beneficial to the public. Would it not be moſt unjuſt providence, to apply, for the ſake of indulging the caprice or oſtentation of a ſovereign, that which is contributed by millions of people, to enrich a particular perſon, who by ſome chance accident, in a matter that was of little importance to the community, has done ſomething that was agreeable to, and that has gained him the favour of his prince?

XXVII. Alexander ordered his treaſurer to give to the philoſopher Anaxarchus, any ſum of money he ſhould deſire. He requeſted a hundred talents; and the treaſurer informed Alexander of the exceſſive demand of the philoſopher; to which Alexander anſwered, *he has done very right, for he well knows that he has a friend who is both able and willing to give him that ſum*; and ordered the treaſurer to pay him the money immediately. Is this liberality? It is true, that it is celebrated as ſuch in an infinite number of books; but I ſay, that it was no ſuch thing, for that it ſhould rather have

been termed mad prodigality, which is the legitimate child of vain-glory; and that it was not only prodigality, but cruelty and tyranny. With thoſe hundred talents, he might have adminiſtered to many diſtreſſes; and if a prince has ſuperfluities, he ſhould lay them out for ſuch purpoſes. But refraining to adminiſter to the hunger and neceſſities of numbers of poor people, to ſatiate the gluttonous cravings of an avaricious philoſopher, was a glaring act of partiality, which rendered it doubtful, which of the two was the moſt unjuſt perſon, Anaxarchus for demanding ſuch a ſum, or Alexander for gratifying him in his demand.

XXVIII. The ſame Alexander, being requeſted by his friend Perilus to furniſh him with a ſum of money to portion out his daughters, ordered fifty talents to be delivered to him. To which Perilus modeſtly replied, that ten would be ſufficient; to this Alexander anſwered, *that is not a matter for my conſideration, for although ten talents would be as much as would anſwer your purpoſe, it would not be a preſent ſuitable to my grandeur.* I find this celebrated by many writers, as a noble and magnanimous act, and Alexander's ſaying upon doing it, as a commendable and a well-pointed one; but in my opinion, the act was an act of madneſs, and that his ſaying upon doing it, was a very weak and trifling

trifling one. Does the grandeur of a prince conſiſt in extravagances and profuſions? Does it diſplay grandeur, to take from many what is abſolutely needful for them, to furniſh a few others with ſuperfluities? It does not, but rather ſavours of injuſtice, baſeneſs, and tyranny; and they only can call ſuch behaviour magnanimous, who have loſt the uſe of their underſtanding.

XXIX. A thouſand crowns in ſpecie, were one day preſented to Don Alfonſo, the fifth king of Arragon of that name, and the firſt of Naples. A perſon who was ſtanding by at the time, ſaid, *How happy it would make me, if all that money was mine!* To which the king anſwered, *Take it then, for I am deſirous of making you happy.* Was this magnanimity? I know that it has been cried up as ſuch; but I ſay, it rather ſhewed weakneſs of mind, and a want of reſolution proper, to reſiſt an abſurd impulſe of vain-glory. I ſuppoſe alſo, that it was from the want of thinking or reflexion, that the king was guilty of that profuſion, and that he was hurried into it by his vanity, which ſuggeſted to him, that making the man a preſent of the money would blazon his fame, and manifeſt to the world, that he had both the diſpoſition and the power to make a man happy. But I would

aſk

aſk him (and this is a queſtion that might be put to all the princes in the world) whether, if it is an act of greatneſs to make one man happy, it is not a much ſuperior one to make a great many ſo? If it is glorious in a ſovereign to make an individual happy, is it not beyond compariſon more glorious, to make a whole nation ſo? And there is no doubt but this might be done, if a prince would avoid all profuſion, and regulate his conduct by a diſcreet œconomy; if he would curtail all ſuperfluous expences, be a check upon the avarice of his miniſters, or elſe deliver the adminiſtration of his affairs into the hands of none but men of integrity, who are capable of proportioning the contributions to be paid by his ſubjects to their abilities, and who ſhould be careful, not to over-burthen the huſbandmen and manufacturers; for theſe are the people, who by their labours, are the principal inſtruments of enriching a ſtate, and whenever they find the weight of the taxes, ſqueeze out of them the greateſt part of their earnings, they will leave off work, and betake themſelves to an idle and vagabond life. To ſum up the whole, a prince, by conforming to the precepts that are dictated by juſtice, religion, and prudence, and by not beſtowing on any one in particular, more than his neceſſities demand, or than is due to his merits, will become the common

father

father of his people; and by extending his paternal care, and diſpenſing his generoſity with an equal and impartial hand to them all alike, will be able to make them all happy.

XXX. The royal treaſury, may be compared to the ocean. It receives its pecuniary contributions from all the monies in the kingdom, as the ocean does its ſtock of waters from all the rivulets, fountains, and ſtreams in the whole world. The royal treaſury then, ſhould do by the kingdom, as the ocean does by the world; that is, after permitting thoſe waters to be exhaled in vapours, return the ſame ſtock in refreſhing rains, to fertilize the earth. It would argue a great defect in the ſovereign providence, as the ſtock of the ocean is ſupplied by all the waters of the world, if he was only to permit a return of them, to fertilize here and there a diſtrict, in conſequence of which, all the reſt would become barren. Juſt ſo, would it be an intolerable abſurdity in human government, to apply the money of the public treaſury, to which the whole kingdom has contributed, in prodigal donations to enrich a few individuals, and by with-holding it from all the reſt, leaving them in diſtreſs and miſery.

XXXI. The

XXXI. The reigning emperor of China at the beginning of this century, was with reſpect to the matter we are treating of, one of the greateſt examples, that ever has, or perhaps ever will be exhibited to the world. I rely on the authority of Father Contancin for the truth of this aſſertion, and on the account he gives of this emperor in his letters, which are dated at Canton the latter end of the year 1725, and which are copied into the 18th volume of edifying and curious letters of foreign miſſionaries; but I only at preſent, have before me an extract from them, which is inſerted in the ſecond volume of the Memoirs of Trevoux of the year 1728.

XXXII That prince, laboured inceſſantly to promote the good of his ſubjects. The object abſorbed all his thoughts, and occupied his whole attention. Every day of the year, and all hours of the day, were days and hours of giving audience and expediting buſineſs; and he ſcarce devoted any to amuſement or recreation. To provide for the conveniences of his own perſon, he uſed the riches of his treaſury with great moderation; but he expended them with a truly royal magnificence, when he adminiſtered to the neceſſities of his people. He procured punctual information, of the ſtate and condition of all his

provinces, and took care to know, which of them was opulent, and which indigent; this he did, to the end, that he might ſuccour with the greater eaſe, ſuch of them as were in diſtreſs. If any town had been deſolated, either by an earthquake or a conflagration, if any province had ſuffered by an inundation, or by any adverſe accidents, had been prevented from yielding their uſual produce, or if by any other chain of accidents, a province happened to be impoveriſhed, he immediately remitted large ſums, to repair their buildings, and to relieve their poor. All his ſubjects experienced to flow from his bowels, a balſam of tenderneſs, compaſſion, and paternal love, which healed all their calamities, and relieved all their diſtreſſes.

XXXIII. In the ſame year, 1725, ſome provinces ſuffered greatly from exceſſive rains, and the emperor took meaſures to relieve the diſtreſſes that had been occaſioned by them, which, in order to do more effectually, he ſent inſtructions written in his own hand, to the principal men and mandarines of all his empire, which began thus; *This ſummer, extraordinary and uncommon quantities of rain have fallen, and the provinces of Pekin, Chantong, and Honan, have been inundated by them. I feel much for the diſtreſſes of my people who inhabit thoſe provinces; and*

and have it much at heart to relieve them. Their afflictions are continually preſent to my imagination both night and day, nor can I enjoy ſound ſleep, or tranquillity of mind, while I know that my ſubjects ſuffer; and as it is abſolutely neceſſary to ſend immediate relief to thoſe vaſt numbers of poor diſtreſſed people, I command you great men and magiſtrates of my empire, to chooſe ſome truſty and able perſons, ſuch as are capable of executing my inſtructions, and who prefer the public good to their own private intereſts; and diſpatch them to the three before-named provinces, to diſtribute to the afflicted inhabitants of them, the tokens of my benevolence and compaſſion. Let them ſcrutinize the moſt obſcure and remote corners, to find out all the poor and diſtreſſed, to the end, that no one may remain without proper ſuccour and relief. I know that it has ſometimes happened, that in the making theſe ſort of diſtributions, acts of injuſtice and partiality have been committed; but I will take care that the conduct of thoſe you ſend ſhall be watched, and do you look to it alſo.

XXXIV. There is another teſtimony in the before recited letter, which does honour, not only to the generoſity and benevolence of this prince, but to his heroic diſintereſtedneſs alſo. It having been cuſtomary with him for a great many years, to releaſe a certain province from paying

paying a part of their annual tribute; which he did becauſe he thought it was juſt and neceſſary. The inhabitants, to expreſs their gratitude for this kindneſs and generoſity to them, meditated erecting ſome monuments to his honour, and had actually begun the work, which the governor of the province informed him of. To which information of the governor's, the emperor gave the following anſwer: *What you acquaint me with, is totally diſagreeable to me, and what I by no means approve. When I conceded this grace to the inhabitants of the province you preſide over, I had no other motive or view in doing it, than that of acting juſtly by, and making all my ſubjects happy alike; but had no intention of procuring to myſelf a vain honour. Such expences are ſuperfluous and unneceſſary, and can never be of any uſe or benefit to me; and as I have ſent proclamations through all my empire, exhorting my people to practiſe frugality and œconomy, I wonder how they could preſume to think of running into theſe needleſs and mad expences, or how you could permit them to do it: it is alſo to be apprehended, that the inferior officers who are generally the collectors of money for theſe purpoſes, may be tempted to put part of it into their own pockets. Prohibit therefore immediately, the proceeding any further in this matter, and with reſpect to the edifice and monument of ſtone, I*

forbid the erecting of it; and I repeat again, that when I do these acts of grace and favour, it is not with a view of acquiring a vain reputation, but because I think it just and necessary; and to the end, that every one may be enabled to do his duty in society, and that the tranquillity and happiness of my subjects in general may be established on a solid foundation.

XXXV. All the conduct of this prince was of the same tenor. He with a most sagacious penetration, attended to the proceedings and conduct of all the mandarines; and gave them instructions, that they should apprize him of all that occurred to them, which might conduce to promote good government. He made many regulations, that were just and wise; he established premiums for the husbandmen, who had distinguished themselves by their industry, and the improvements they had made in agriculture; and for the manufacturers and mechanics, who had signalized themselves by their diligence and ingenuity; he made provision for the widows of virtuous citizens, and settled rewards that were to be paid to such children, as distinguished themselves by their filial care of, and tenderness to their aged parents, &c. and is this Prince who was so perfect in his morals, and so great a pattern of policy,

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the ſame man, who proſcribed Chriſtianity throughout all his dominions? I fear we muſt be obliged to anſwer in the affirmative, and to contemplate with aſtoniſhment, the inſcrutable ſecrets of the divine Providence; and to exclaim, *Oh! how incomprehenſible are God's judgments, and how untraceable are his ways!* But the blindneſs of this emperor in matters of religion, ſhould not preclude our recommending him as a ſignal pattern, of that ſort of œconomy and liberality which ſhould be practiſed by princes.

XXXVI. I have ſaid *of the œconomy and liberality*, for both theſe virtues, are found to be perfectly compatible with each other, and to be admirably reconciled together in the practice of that prince. The true and proper effect, and eſſential operation of liberality, according to the doctrine of St. Thomas, conſiſts, in proportioning our affection for money in ſuch a manner, that our exceſſive love of it ſhall never obſtruct our laying it out for ſuch purpoſes, as are juſt and laudable. Thus the epithet of liberal, does not belong to him who expends it to indulge his whim or humour, or from motives of oſtentation, or to gratify his affection for ſome particular people, he is deſirous of enriching; for all this is prodigality: but he deſerves to be called liberal, who applies money

to promote and accompliſh virtuous ends, and who is always ready to part with it, when it may be made conducive to promote ſuch purpoſes. There is field enough within theſe limits, for the exerciſe of the virtue of liberality. He is liberal, who ſuccours the poor, rewards the deſerving, ſupports by generous donations men of ability, and who conſtructs uſeful public edifices, and, in general, all money that is laid out for the benefit of the public, may be ſaid to be expended on objects of liberality, which liberality, if judiciouſly extended, may be deſerving of the epithet of magnificence. Theſe two laſt virtues are diſtinguiſhable from each other, by the firſt being limited not to exceed the bounds of moderation: and the other being permitted to extend to the expending vaſt ſums, provided the money is laid out from laudable motives, and on objects, that are really conducive to the public utility. Thus Louis the Fourteenth did an act of magnificence, in building the Hoſpital of Invalids at Paris, and did a much ſuperior one, by conſtructing the canal, that makes a navigable communication between Languedoc and Bourdeaux; becauſe the great expences that attended executing theſe works, were incurred to promote the public good, and actually were great advantages to the public at large; but the palaces that were built by Nero and Caligula, which

which occupied as much ground as two large towns might have ſtood on, do not deſerve to be called works of magnificence; becauſe the vaſt ſums that were laid out in conſtructing them, were by no means expended to promote the public good, but only to gratify the oſtentatious vanity of two profuſe men. The emperor Adrian was magnificent, by forgiving at once, the payment of all that was owing to him for the ſixteen preceding years, by Rome, Italy, and all the imperial provinces; but Alfonſo the Twelfth of Caſtile was prodigal (provided the ſtory that is told of him, and circulated in ſo many books reſpecting this matter is true) in expending a vaſt ſum of money, for the redemption of Baldwin, emperor of Conſtantinople; as the firſt caſe concerned the whole Roman empire; and Spain was not at all intereſted in the laſt.

XXXVII. Finally, A prince may exerciſe not only his liberality, but his magnificence alſo, by beſtowing great donations, upon here and there an individual of ſignal and ſuperior merit, (but I would be underſtood to mean ſuch merit as has been beneficial to the ſtate) becauſe in doing this, his attention may be ſuppoſed, as not confined to rewarding the virtue of a ſingle man, but to the exciting the emulation of

many. And conſidered in this light, what Spain gave to Colon, did not exceed the bounds of juſtice and moderation; what ſhe gave to Cortez was little; and what ſhe gave to the great Captain next to nothing. When a prince or nation ſhould exerciſe magnificence, if the donation they beſtow is not equal to the merit of the perſon it is conferred on, or the dignity of the party who confers it, it can never deſerve to be termed liberality, for there is no middle way in theſe caſes, and if the gift does not amount high enough to be deſerving of the epithet of magnificence, it declines to the other extreme, and ſinks into parſimony.

PARADOX IV.

There is more Objection made to promoting People to important Employments on account of their Youth, than there ought to be.

XXXVIII. As in the uſe of their potential or intellectual faculties, ſome give early tokens of dulneſs or perverſeneſs, and others diſplay bright tokens of commendable and uſeful talents; which render it probable, that the ſtate would prevent great miſchiefs by the early chaſtiſements of the firſt, and that it would reap great benefits by the timely favouring and encouraging

the virtuous bodings of the ſecond; as there are young men, who in prudence and underſtanding excell thoſe who are much further advanced in years. If ſuch, in the prime of their lives, were promoted to fill poſts of importance, the ſtate would for a long time, reap the benefit of their good adminiſtration: whereas, by deferring their advancement till they grow old, this benefit is but of ſhort duration. The moſt learned and penetrating ſociety of Jeſuits, at the age of thirty-eight, raiſed to the high poſt of Prepoſitor-general of their Order, Father Claudius Acquaviva. Who can entertain a doubt, but that in ſo extenſive a ſociety, there were many men further advanced in life, poſſeſſed of all the requiſites for the well-diſcharging the duties of ſuch an office? But notwithſtanding this, Father Acquaviva, at this age, was preferred to all the others, to fill this important ſtation; this was done, either becauſe he poſſeſſed the requiſite qualities for diſcharging the duties of the office in a more eminent degree than the others, or becauſe, although they might be equal to him in talents, there was a probability of their enjoying the fruits of his excellent government for a much longer time, than they were likely to enjoy the benefit of the ſervices of thoſe who were further advanced in life; in which expectation it turned out afterwards that they were not diſappointed. The famous Servita Fray Pablo

Sarpi was made Provincial of his Religion, at the age of twenty-ſeven. The portentous talents of that young man, gave juſt reaſon for their electing him, and their judgment in doing ſo, was afterwards confirmed by the ſentiments of the republic; who appointed him, contrary to their ordinary practice, at about the ſame period his own ſociety conferred this honour on him, their Counſellor. It is true, that this extraordinary favour of the republic, was very injurious to the religious character of Father Sarpi, for he engaged with ſuch warmth in defence of the ſtate, againſt the pretenſions of the Apoſtolic See, that only in his habit of a friar, he preſerved the appearance of being a Catholic.

XXXIX. He who at thirty, has the diſcretion that people commonly have at fifty, when he arrives at the age of forty, will have a diſcretion, much ſuperior to that of the bulk of mankind. And this exceeding will be greater ſtill, if from the age of thirty, he begins to exerciſe his talents in public buſineſs, as he will go on improving them more and more every day by his practice. Why then ſhould not the ſtate encourage the cultivation of a ſoil, which is capable of producing ſo much for their ſervice? Or why ſhould they loſe any part of the copious fruit, that may be produced from ſuch a ſtock?

XL.

XL. To this reaſoning I ſhall add, that when there is an equality of intellectual talents, the middle age ſhould be preferred to the more advanced, for that is the time, in which the faculties of both body and mind are in their full vigour, which are things of great importance, in the good adminiſtration or execution of public buſineſs. What might be gained by the experience of a man who has had a great deal of practice; if he happens only to begin to act at a time of life when his faculties are on the decline, may be overbalanced by the loſs that would be ſuſtained by the languid execution of his deſigns. I am perſuaded that the miſcarriages of Cyrus, Pompey, and other famous warriors in their advanced ſtate of life, who had always been conquerors in the days of their youth and vigour, was owing to no other cauſe but this; and am of opinion, that they attributed to a falling-off of fortune, what only reſulted from a decadence of their robuſtneſs, and the activity of their minds.

XLI. It may perhaps be objected to what I have been advancing, that it is in but here and there a rare inſtance, that this doctrine of mine will apply, for that it is very uncommon to meet in an early time of life, with a man of equal ability, to one who is more ad-

advanced in years; and that if I only mean to recommend, that in theſe rare inſtances, they ſhall have the preference given them, I have been beating my brains to little purpoſe; for that this is already an eſtabliſhed practice; and there is no man who has obſerved the world with any attention, who is not convinced, that we have had here and there an inſtance, of a young man being preferred to one more advanced in years?

XLII. But to this, I reply in the firſt place, that admitting, in theſe particular caſes, what is juſt and proper has been done, it does not follow from thence, that the doctrine we have been laying down is uſeleſs; for although our arguments on this head may be unneceſſary as an inſtruction to thoſe who have the diſpenſation of employments, they may be of uſe by way of reproof or correction, to grumblers and complainers. A young man ſcarce ever attains any honour or preferment, but a thouſand old unprofitable ones murmur at it, and not only a thouſand old ones who are uſeleſs, but the majority of the young ones alſo; who by being of about the ſame ſtanding in life, are ſtimulated to ſhew reſentment, by the fire of emulation.

XLIII. We ſhall anſwer ſecondly, that a young man's excelling old ones in underſtanding and

and judgment, is nothing near ſo uncommon as is generally imagined, but is rather a thing which we experience very frequently. There is ſcarce a community conſiſting of twenty or thirty individuals, where we do not ſee a particular young man, better informed, and more capable than many of the old ones. This proceeds, from the temperaments of men having generally a greater effect on the faculties of their minds, than their ages. The exceeding that a man experiences in himſelf in this reſpect at fifty years of age, and at thirty-five, is ſeldom very conſiderable, and will rarely be perceptible, if he has not paſſed the laſt fifteen years, from a life of much indolence, to one of much application. On the contrary, the exceeding there is between ſome men and others on account of their different temperaments and geniuſes, is enormous. We every day ſee thoſe, who from their aptneſs at acquiring every ſcience and faculty, will become adepts in them, in a quarter part of the time, that others are obliged to employ in hard ſtudy to attain them.

XLIV. From this great difference in the temperaments and genius of individuals, ſpring thoſe prodigious advances of ſome young men in literary attainments, which are frequently not equalled, by thoſe who have ſtudied till eighty. Such for example as John Pico de Mirandola, the

the Scotch man Jacob Creighton, the Spaniard Fernando de Cordoba, Gaſpar Scioppius, Hugo Grotius, Spanolito who is now the wonder of Paris, and others. We might add to theſe examples many more, which are not ſo well known, but which are not leſs extraordinary; but we ſhall content ourſelves with pointing out two, that are the moſt ſtriking ones. The firſt is Guſtavus de Helmfeld, the ſon of a Swediſh Senator, who at ten years of age, could ſpeak twelve Languages, the Swediſh, the Muſcovite, the Poliſh, the French, the Spaniſh, the Italian, the German, the Flemiſh, the Engliſh, the Latin, the Greek, and the Hebrew; he beſides had a knowledge of philoſophy, and a tincture of that of theology, and alſo underſtood ſome parts of the mathematics.

XLV. But the prodigious child, that was born at Lubec in 1721, and died in 1725, exceeded every thing we have hitherto heard of. His name was Chriſtian Henry Heneiken. The relation I ſhall give of him, is taken from the firſt volume of the Memoirs of Trevoux of 1731, into which it was copied, from the accounts we have had of him from various authors of the ſame city and country, all of whom were eſteemed men of the greateſt credit and veracity. This ſurprizing child, at ten months old begun

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to ſpeak, and at twelve, underſtood the principal events contained in the Pentateuch; and at thirteen, thoſe of the hiſtory of the Old Teſtament; at fourteen thoſe of the New; and at two years of age, he anſwered pertinently to any queſtions that were aſked him, concerning antient or modern hiſtory, and likewiſe, with reſpect to geography. He very ſoon after, began to ſpeak Latin with eaſe, and immediately upon that, French alſo. Before he entered into his fourth year, he knew the genealogies of the principal houſes in Europe, and explained ſenſibly and judiciouſly, many ſentences and paſſages of holy ſcripture. He ſoon after this, learned to write, at a time when he was ſcarce able to hold the pen. He abhorred all other aliment except milk, which muſt always be that of the nurſe who firſt begun to ſuckle him; ſo that he was not weaned till a few months before his death. He was of a very delicate frame, and frequently viſited with ſickneſs. And at length, on the 27th of June, 1725, he died; filling with aſtoniſhment all thoſe who knew him, at the conſtancy and heroic reſignation he ſhewed through the whole courſe of his ſickneſs, till the period, that he ſurrendered his ſoul into the hands of his Creator.

XLVI. I am very well aware, that the circumſtances of this hiſtory may have been exaggerated,

gerated, but I do not find any thing impoſſible in them. Who knows the ultimate bounds, to which the ability of man may extend? Perhaps there may be none aſſigned to it, but that it may continue to increaſe more and more, and that the limits of its extenſion have never yet been fixed or aſſigned. With reſpect to his eſſential perfection, all philoſophers and theologians agree, that no creature was ever ſo perfect, but that God may create another ſtill more perfect. Why then with regard to accidental perfection in the ſame ſpecies, do we not ſee the ſame thing? Our groſs mode of reaſoning, is apt to confine poſſibility within the narrow limits of our experience. That which we never ſaw, we imagine can never happen; as if in the little which God has been pleaſed to preſent to our view, is diſplayed the utmoſt extent of the omnipotent power. Setting bounds to poſſibility, is ſetting them to the operations of the all powerful.

XLVII. I agree, that our aſſent to the exiſtence of a thing, ſhould not be extended ſo far, as not to be confined within leſs bounds, than the immenſe ſpace of poſſibility; letting our belief be regulated by probability, is much ſafer, than letting it extend to poſſibilities; poſſibility, can only be meaſured by the extent of the divine power; probability, may be guided and limited by

by the force and credibility of teſtification. Thus he would act prudently, who with reſpect to the hiſtory of the child of Lubec, ſhould reject a good portion of the circumſtances, but ſtill admit enough of them, to render the ſtory a moſt wonderful one, the like of which, had never been known in former ages; as it is not probable, that the authors who were the countrymen of the child, ſhould lie exorbitantly, in a caſe where if they had deviated greatly from the truth, it was in the power of thouſands of living witneſſes to have convicted them of the impoſture.

XLVIII. From the beforementioned examples, and an infinite number of others that might be inſtanced, may be inferred, the enormous difference there is between ſome ſouls and others, which difference, is owing ſolely to a difference of temperament; compared to which, that produced by a diſparity of age, is very ſmall, even if we compute it from early manhood, to the period of decadence. The reſult of my own obſervation, with the exception of here and there a rare inſtance, is, that thoſe who at thirty years old are dull, will alway be dull; that thoſe who at that age are imprudent, will always be imprudent; and that thoſe who at thirty, in matters of argument or converſation, do not talk pertinently, or reaſon well,

well, will never reaſon well. I do not however deny, that cultivation will not improve both men and plants, but it will never make thorns bear grapes, or brambles figs.

XLIX. I think there ſeems now to remain but one objection for me to anſwer out of all thoſe that have been urged to what I have advanced; and that is, that although admitting ſome have a great natural ſuperiority of talents compared to others; ſtill, the impetuoſity and fire which commonly prevails in the flower of a man's youth, is apt to have a pernicious effect on his conduct. Granted. But beſides the exceptions to this rule being infinite, as we every day ſee youths, who are very ſedate and diſcreet; and to which we may add, that there is another paſſion very predominant in old people that is productive of much more miſchief in public affairs, than the fire or impetuoſity of youth; I mean the vice of avarice, in the operations of which, there is not a moment's relaxation; on the contrary, the paſſion of anger, is only apt to be excited by particular accidents, and when the ebullitions of choler abate or ſubſide, they are ſucceeded by long intervals of calm and tranquillity. Anger is a tranſitory fury, or a fever of ſhort duration, whoſe attacks are ſudden, and laſt but for a little while, and which in

in a moderate ſpace of time vaniſh and diſappears; but avarice is a harpy, that has neſted itſelf in the heart, and is a dropſy of the ſoul, which increaſes and grows worſe every day. The firſt, now and then diſturbs and irritates the moral temper of man; the other, vitiates all his actions, becauſe its venomous influence ever exiſts. The firſt grows weaker every day, and is enfeebled by its own exertions; the other, is inceſſantly gaining new ſtrength, and becoming more powerful, *vires acquirit eundo*; ſo that avarice contrary to the ordinary courſe of nature, is by ſo much the more vigorous, by ſo much the older it grows; it is a paſſion, that not only acts in cold blood, but acts with ſo much the more activity, the colder the blood grows; and hence it is, that its miſchiefs are not only greater than thoſe produced by anger; but they are alſo much more incurable. Thus if the infirmities incident to youth, are pernicious in thoſe who occupy poſts of importance in the public line, thoſe that are attendant on old age are much more ſo.

PARADOX V.

All Handicraft Trades ſhould be hereditary.

L. In Lacedemonia, which was one of the beſt-governed ſtates of antiquity, it was an inviolable law, as Herodotus informs us, that the ſon of a huſbandman, ſhould be bred a huſbandman, and the ſon of a taylor, a taylor, and the ſame with reſpect to all other occupations where people earn their living by their labour. The ſame practice prevailed in Egypt, and prevails among the idolatrous people of Indoſtan at this day.

LI. I know very well, that to enforce the importance and propriety of this paradox, the authority of theſe, and other ſuch examples that might be inſtanced, is weak, compared to the infinite number of oppoſite ones that might be produced againſt it. Therefore, it will be abſolutely neceſſary for us to have recourſe to reaſon, to ſupply this defect of authority.

LII. It appears to me, that two advantages of great importance would be derived to the public by trades being hereditary; the firſt of which is, that it would contribute greatly to the

the perfectioning of arts. When there is no other relation or connexion between the maſter and his pupil, than the latter being the apprentice of the firſt, the maſter is ſeldom very anxious about inſtructing his ſcholar; and what is more, he is not well diſpoſed to communicate to him any particular ſecrets of his art, which he has acquired by virtue of his own penetration and experience; and generally, contents himſelf with inſtructing him in what is commonly known and practiſed. But there is no reſerve of this ſort, when the inſtruction is conveyed from the father to his ſon, for paternal love cannot aſſent to it; and hence it is, that where the ſkill of the maſter is equal, he will be better taught who learns of his father, than he who is inſtructed by a ſtranger.

LIII. By this total tranſlation of ſkill from father to ſon, and by the ſame trade being continued in, and handed down to their poſterity, there would without doubt reſult this benefit, that the art of it would be improved, and that it would continue advancing every age, nearer and nearer to perfection. It is very common, for one artiſt to make ſome improvements on what he has learned from another; and it is very common alſo, for him who has made them, to let them die and be buried with him; on ac-

count of its being againſt his intereſt, to communicate them to other people. This impediment to making his improvements known, ſeldom ſubſiſts between father and ſon; becauſe the father, moſt commonly conſiders the intereſt of his ſon as his own; and conſequently, communicates to his ſon all he knows. If the ſon from his own ingenuity, makes improvements on what he had been taught by his father, and hands them down to the grandſon; and they all continue to do the ſame by their ſucceſſors; the arts by this means, would proceed to approach nearer to perfection every generation.

LIV. There are two other circumſtances that are very worthy of being attended to, which would contribute to recommend this political ſyſtem for improving the arts; the one is, that children would begin to learn much ſooner than they commonly do. In the houſe of an artificer, where the ſon is deſtined to follow the trade of his father, he will ſcarce have done ſucking the breaſt of his mother, when he will begin to drink the milk of his father's inſtruction; in conſequence of which, not only time would be gained, but his application to the buſineſs would become more natural to him. The other circumſtance is, that the ſtate would avoid the loſs of many good artificers, which is occaſioned

by

by the inconſtancy of the tempers and diſpoſitions of youth. Thoſe, who by continuing to work at the trade they firſt began to learn, would become excellent artificers, by going on to change their occupations continually, would never arrive at being more, than mere novices, or beginners; and this miſchief would be avoided, by obliging the ſon of every handicraft perſon, to follow the trade of his father.

LV. The ſecond convenience that would reſult to the public by trades being hereditary, is, that it would aſcertain the ranks and claſſes of people in a ſtate; it being no uncommon thing, for diſputes to raiſe between families, about birth and precedence; which inconvenience would be remedied by ſuch a regulation, as in ſuch a caſe, the rank of moſt people would be aſcertained, and the cauſe of theſe diſputes in a great meaſure removed.

PARADOX VI.

Torture is a very fallible means for diſcovering the truth in criminal Caſes.

LVI. I enter upon this eſſay, begging permiſſion of all tribunals of juſtice to ſpeak my ſentiments on this head. I venerate the laws and

the uſe of them; but as I am treating here of ſuch as are purely human, I apprehend I may be permitted to reaſon on the tendency or propriety of them. Nor is the torture being admitted in the eccleſiaſtical courts, as a mode of enquiry in the examination into crimes, any objection to my doing this, for as the learned Canoniſt Francis Schomer obſerves, this practice is not conformable to the antient diſcipline of the church; and he quotes other authors in ſupport of this opinion, and ſays further, that in a long courſe of time, it by little and little, came to be transferred from the ſecular tribunals to the eccleſiaſtical ones: *Predetentim à curiis ſæcularibus ad eccleſiaſticas perveniſſe* (Schmier in Supplem. ad lib. v. Decret); ſo that doubting of the propriety of inquiring by torture in the eccleſiaſtical courts, amounts to no more, than diſputing whether the antient or modern practice of thoſe courts, is the moſt conſonant to reaſon.

LVII. Beſides, this being a matter which in its own nature is open to controverſy, there are two notable circumſtances in it, which encourage me to enter upon the diſcuſſion of the point. The firſt is, that very many people think as I do on the ſubject, and that among thoſe very many, there are more than a few of the

the very judges, who practiſe ordering the tor ture, in caſes where that practice has been long eſtabliſhed. Their ſentiments in theory do not correſpond with their conduct, but notwithſtanding this, they act as they ſhould do, for they have no authority to diſpenſe with the laws, but are only miniſterial under them. The ſecond is, that the moſt learned father Claudius Lacroix, has preceded me in publiſhing the ſame ſentiments I entertain on this ſubject, in his firſt volume of Moral Theology, lib. iv. &c.

LVIII. Countenanced and encouraged by ſo illuſtrious an author, whoſe opinion in queſtions of morality is ſo much reſpected, and ſo generally aſſented to by all Chriſtendom, I ſhall enter upon the undertaking boldly, and ſhall argue with ſpirit in ſupport of his opinion and my own. The extent of the queſtion is but ſhort, and whenever reaſon ſets its foot within its boundary, it ſoon arrives at the end of it.

LIX. It cannot be denied, that the not confeſſing in the torture, depends upon the ſpirit and fortitude of the perſon tortured, to reſiſt the rigour of that trial; and I aſk now, is this ſpirit and fortitude produced by the innocence of ſuch a perſon? It clearly is not, but rather by the robuſtneſs of mind or body

which that perſon poſſeſſes. The torture then, can be of no uſe to aſcertain the guilt or innocence of any one, but it is the bodily ſtrength or weakneſs of mind, of whoever is unfortunate enough to experience its rigour, that determines the point.

LX. Nero having unjuſtly repudiated his wife Octavia, and married Poppea, ſhe not content with having uſurped the bridal bed, and crown of Octavia, but in order to deprive her of life and honour alſo, accuſed her of having had a criminal correſpondence with a ſlave. For the purpoſe of aſcertaining the guilt of Octavia, ſix of her female ſervants were put to anſwer by the torture; and what was the reſult of this? why, that ſome of them declared her guilty, and others denied it. Did not they all know that the accuſation was falſe? and do not all authors agree that they did? But what did this ſignify, if, in the torture, their pain, and not their veracity, influenced them to confeſs ſhe was guilty of the crime? Whoever has fortitude enough to endure the rigour of the cord, will deny the fault he is tortured to confeſs, although he was really guilty of it; whoever has not, will confeſs a crime he never committed. The effects of the torture on the ſervants of Octavia, tended to prove the fortitude of ſome of them, and the weakneſs of others;

others; but for aſcertaining the truth were of no uſe.

LXI. It ſeems then, that the innocent are expoſed to equal danger from the torture with the guilty. A terrible inconvenience this, but the worſt part of it is, that the danger is not equal, but greater on the ſide of innocence. I may be told that I am advancing a new paradox, and I confeſs that I am, but if I am not greatly miſtaken, I ſhall make it appear, that I have been advancing nothing that is not ſtrictly true. It is a known fact, that thoſe who are daring enough to commit great crimes, are much more hardened, robuſt, and ferocious people, than thoſe who lead a quiet and regular life. It ſhould follow then from theſe premiſes, that they are better calculated to endure the rigours of a torture, than the tranquil and inoffenſive part of mankind; and it will alſo follow from thence, that theſe laſt will be more likely to confeſs themſelves guilty of a crime they are falſely accuſed of, than the others will be, to confeſs one they have really committed. This is a remark made by father Lacroix, and the following are his words: *ſequitur per torturas ſæpè everti juſtitiam, quia innocentes, qui ſæpè ſunt impatientes dolorum, coguntur ſe fateri nocentes*;

centes; e contra nocentes, qui plerumque ſunt ferociores, tolerata tortura ſe probant innocentes.

LXII. On the contrary, thoſe of quiet and peaceable diſpoſitions, are generally people of more delicate feelings than the others, and eſpecially, if their mode of living has correſponded with the native excellence of their tempers. From whence it ſhould follow, that the probable reſult of putting one of theſe to the torture, would be, that he would ſooner confeſs himſelf guilty of a crime he never committed, than one of the others, would own himſelf guilty of one he had actually perpetrated.

LXVIII. I conſider the ſentiment of Plato to be a true one, who ſays, that great vices, no leſs than great virtues, require great powers and fortitude to exerciſe them. The ſerenity with which Geronimus Olgiatus, Balthaſar Gerardus, and Francis Ravillac, the firſt for the aſſaſſination of Galeazus Maria duke of Milan, the ſecond for that of William prince of Orange, and the third for that of Henry the Fourth of France, fully demonſtrate, that thoſe who dare attempt great and dangerous things, are capable of enduring great torments.

LXIV.

LXIV. I ſhall conclude this ſubject, with the ſtriking, and moſt efficacious teſtimony of Father Frederic Spe, which throws all the light upon this matter that can be wiſhed for, or deſired. This learned German Jeſuit, when he is treating of the little dependance there is to be placed on the confeſſions of people accuſed of witchcraft, which confeſſions have been extorted from them by the rack; quotes, in ſupport of what he advances, the teſtimony of the Baron de Leibnitz, and Vincent Placcius, whom he ſuppoſes to be the author of the anonymous Treatiſe, intituled, *Cautio criminalis in proceſſu contra ſagas.*

LXV. Father Spe, when he is ſpeaking of the confeſſions that have been made by ſuppoſed witches and wizards, when put to torture, delivers himſelf thus; the numbers of lyes they will tell, both of themſelves and others, is incredible. All which the judges are deſirous they ſhould ſay is true, they confeſs to be true; and they own every thing they would have them own of themſelves, compelled to it by the violence of the torture; and they do not afterwards dare to retract what they have ſaid, for fear of being tortured again; thus theſe miſerable wretches, go to their deaths atteſting a falſehood. Father Spe concludes in this manner, I am certain that what I have ſaid is juſt and right,

right, and I appeal for the truth of it, to the judge of that ſupreme tribunal, where all mankind, both quick and dead, will one day be ſentenced to rewards and puniſhments, proportioned to their merits and demerits.

LXVI. I declare that when I firſt read this account, I found my whole frame pervaded by a deep melancholy ſenſation, that reſembled ſomewhat like horror mixed with pity. He who gives the relation, is a learned, grave, exemplary, and found divine, inſtructed in this caſe, not by conjectural reaſoning, but by certain informations, acquired in the ſacred confeſſional chair, and taken from the mouths of thoſe, who were on the point of being led to execution as guilty people; and this he declared from repeated experience he had had of thoſe matters, during a long courſe of years. What can be objected that is deſerving of any attention, to ſo concluſive a teſtimony?

LXVII. The certainty Father Spe had, of the almoſt invincible force of the torture, to oblige innocent people to confeſs themſelves guilty of crimes they never committed, is very forcibly illuſtrated, in a vehement declaration to the judges, with which he concludes his Eſſay. He ſays to them, why are you ſo ſolicitous in

 ſearching

ſearching out, and why do you take ſo much pains to diſcover, people who are guilty of witchcraft? There is no neceſſity for your giving yourſelves all this trouble, for if you want to diſcover more, I can tell you how to furniſh yourſelves with them, without labour or difficulty; take the firſt Capuchins, the firſt Jeſuits, and the firſt men of any other religious order, that you ſhall meet by chance, and put them to the torture; and if you ſhall be deſirous of making them do ſo, you will find that there is ſcarce one of them, who will not confeſs that he has been guilty of the crime of witchcraft. If any of them ſhould deny it, repeat the torture two or three times, and I will engage that you will bring them to. Pluck out their hair by the roots, exorciſe them, and repeat to them the common-place cant that the devil has hardened them; and as if you was convinced this ſuſpicion was juſt, behave to them, with determined inflexibility, and you will perceive, that there is not one among them, who will refuſe to ſubmit. I have pointed out to you already how you may be ſupplied with an ample ſtock of ſorcerers, but if you want more ſtill, take the prelates of the churches, and all the canons and doctors belonging to them; and by the application of the ſame means, you will be convinced, that they may be all brought to confeſs themſelves guilty of witchcraft; for people who have been

been bred up in ſo delicate a way, will hardly find themſelves able to reſiſt the rigours of a torture. But if you are not ſatisfied with this ſupply, and ſhould want more ſtill, I would recommend to you, to put one or two of yourſelves to the torture, and you will find that you will confeſs alſo in the ſame manner the others have done; and if immediately after this, you were to torture me, you would be ſatisfied, that I ſhould do the ſame. And by this mode of proceeding, you may make witches, wizards, and magicians, of all mankind.

LXVIII. I am ready to admit, that ſo vehement a declamation, ſhould not be made to all judges indifferently, but that it ſhould be addreſſed only to ſuch as proceeded with the little caution thoſe did whom Father Spe alludes to; although it is certain, that in accuſations for witchcraft, there is more danger of innocent people being brought to capital puniſhment by the torture, than there is by charges of any other nature. Every man of diſcretion knows, upon what ridiculous grounds, the common people ſpread reports of folks being guilty of witchcraft, and with what eaſe the world believe them, and how ready they are to teſtify to the truth of ſuch reports. In conſequence of which, if the accuſed perſons happen to be brought before judges, who, like the ruſtic

ruſtic vulgar, are filled with the notion or belief, that there are multitudes of witches and wizards, they immediately have recourſe to the torture, and innocent people are tormented like delinquents. From whence it follows, that thoſe who are falſely accuſed, from their inability to reſiſt the pain of the rack, aſſent to the interrogatory, and againſt their conſcinces own themſelves guilty. To this number, we may add many others, who own themſelves guilty from deluſion or infatuation. This deluſion is contagious, and multiplies and ſpreads exceedingly, whenever there prevails a rage for finding out witchcrafts; for the numbers of theſe delinquents are increaſed, in all places where there are officious inquiſitors after ſorcerers, juſt as the numbers of poſſeſſed people are, where there are plenty of perſevering and abſurd exorciſts.

LXIX. But notwithſtanding that in ſuch accuſations, on account of their being ſo frequently ill-founded, the hazard of innocence being oppreſſed by the anguiſh of the torture becomes greater than in other caſes; ſtill the ſame danger ſubſiſts, though not in ſo great a degree, with reſpect to all thoſe who are falſely accuſed of any other ſerious crimes. I mean, that if any one from want of fortitude, confeſſes in the the torture the crime of witchcraft, which he is

quite innocent of, he may in the ſame manner, and by the ſame means, be brought to confeſs himſelf guilty of a murder, a ſacrilege, a robbery, or any other great offence he never committed. Thus the experience of the learned Jeſuit, with reſpect to the fallibity of the torture in the examination into the truth of witchcraft; identifies and proves its fallibility, in the inquiry into the certainty, of whether any other perſon has been guilty of a crime he ſtands accuſed of.

PARADOX VII.

It ſhould be the Duty of Magiſtrates, to oblige every individual in a ſtate to earn his own living.

LXX. This was one of the laws of the moſt prudent Solon; and it was ſo inviolably obſerved in Athens, that Athenæus tells us, the two philoſophers Aſclepiades and Menedemus, were convened before the Areopagus, to give an account how they got their living; and they obviated the charge that had been brought againſt them, of leading an idle life, and having no viſible means of ſubſiſtence; by proving, that they earned two drachmas every night, by grinding in, or turning a horſe-mill; and Herodotus ſays, that before

before the days of Solon, this ſame law had been eſtabliſhed in Egypt by King Amaſis.

LXXI. There is no doubt, but the ſame eſtabliſhment would be uſeful in all ſtates. Why do I ſay uſeful? It would be laudable alſo, and of the utmoſt importance. By a careful examination into, and attention to this matter, communities would be freed from the nuiſance of great numbers of drones, and poiſonous reptiles. There is ſcarce a populous town or city, where you don't ſee great numbers of people, who without any eſtate or income, and without employing themſelves in any honeſt or uſeful occupation, live well in their houſes, and appear genteelly and handſomely dreſſed in the ſtreets. And what are the funds by which they ſupport all this? why ſome of them ſupport themſelves, by thefts and robberies; others by the vile practice, of proſtituting the beauty of their wives for hire; others by money they borrow of a thouſand people, without any intention of ever paying it; others by tricks and cheats of various kinds, with which they impoſe upon innocent and unguarded peeple; and indeed, if the maſk was to be taken off from all thoſe who are ſaid to live by their ingenuity, it would be found, that almoſt all of them, live by foul practices and roguery; and the

maſk would be taken off, by adopting the before propoſed examination and enquiry, and by providing, and rigorouſly executing puniſhments proportioned to ſuch evils, the body politic, would be purged and cleanſed from an infinite number of vicious humours.

PARADOX VIII.

A great part of what is expended in Alms, is not only thrown away, but does miſchief.

LXXII. The following ſentence of King David's is a remarkable one; *Bleſſed is he who exerciſes his attention and his underſtanding, for the relief of the poor and the needy.* Beatus qui intelligit ſuper egenum, et pauperem.—He does not ſay, bleſſed is he who to ſuccour the poor, exerciſes his love, his compaſſion, or his charity, but bleſſed is he who exerciſes his attention or underſtanding on this object. There is doubtleſs the appearance of a myſtery in this, but the myſtery is, that alms, unleſs diſtributed with underſtanding, diſcretion, and judgment, do no good.

LXXIII. A hand that is precipitate in giving, ſuch a one for example, as Claudian repreſents that of Probus to have been,

Præceps

Præceps illa manus fluvios ſuperabat Ibèros
Aurea dona vomens—

who relieved many poor, but at the ſame time ſupported many people in idleneſs; and ſuch conduct not only ſupports, but it creates or breeds up many ſuch, for wherever alms are diſtributed copiouſly and without diſcretion, there will be found many people, who without this aſſiſtance would betake themſelves to work to procure themſelves a livelihood, who at preſent live idly, and omit their own induſtry, which they are enabled to do, at the expence, and by the profuſion of others. The evils that reſult to a ſtate from ſuch imprudent diſpenſations, are ſufficiently ſerious; it loſes by this means, the work of a great many uſeful hands, and the numbers of the indolent, vicious, and profligate, are greatly increaſed by it.

LXXIV. It is ſaid of a man who diſtributes great quantities of alms, that he gives with both hands; but he ſhould remember, that according to the directions of our Lord and Saviour, he ſhould only give with one; he ſays, when you diſpenſe alms, don't let your left hand know what your right hand does: *te autem faciente eleemoſynam, neſciat ſiniſtra tua quid faciat dextra tua.* This implies, that it is with the

right hand only that alms ſhould be given. If I am told that I dwell too much on the literal meaning of the word, I anſwer it was never my intention to do ſo; for I am inclined to think, there is a profound implied ſentiment couched under this deſcription. It is the conſtant ſtile of holy writ, to uſe the expreſſion right hand, to ſymbolize or define good works, and the expreſſion left hand to ſignify the contrary; and hence it is, that in many parts of it, when it ſpeaks of the hand of God, it never mentions it in an emphatical manner, without the addition of the adverb right, which is uſed to convey an idea, that the operations of God are juſt and holy. Chriſt then requires, that alms ſhould be given with the right hand, by which expreſſion, we may ſuppoſe he meant to ſignify, that there are good and bad alms, and that he approves the firſt, and condemns the others; and alſo to prohibit our giving with both hands, for that this would be proceeding without choice or diſtinction, and would alſo confound the good with the bad.

LXXV. I know ſome divines are of opinion, that we ſhould beſtow our charity, and that it is not incumbent on us to examine ſcrupulouſly into the neceſſities of thoſe we beſtow it on; but this is no argument why a ſtate

ſhould not take proper precautions, to prevent thoſe from receiving the benefit of charitable chriſtian donations, who ought to get their living by their labour, and to exclude all ſuch from being partakers of this benevolence, who ſurrender themſelves up to indolence, and a voluntary and vicious ſtate of poverty.

PARADOX IX.

Death ſhould not be dreaded, on account of what there is ſimply in the thing itſelf, or on account of what a perſon feels at that criſis.

LXXVI. There is a fear of death, which is well founded and ſalutary; another, which is ill founded and pernicious; and another, which ought to be indifferent, becauſe it is natural, and which only by being carried to too great an excéſs can become vicious. He fears death reaſonably and profitably, who contemplates it as a tranſition from hence to eternity; he fears it naturally, who conſiders it as the termination of his life; and he fears it unreaſonably, who viewing it ſimply with regard to what there is in the thing itſelf, abſtracted from all that has preceded, and all that is to follow it, ſuppoſes that it will be attended with exceſſive pain.

LXXVII. This apprehenſion, although it is very common both among the ignorant and the learned, I look upon to be chimerical and vain, and to have no foundation in truth, therefore, I ſhall not ſcruple placing it in the catalogue of vulgar errors. I don't mean to treat here, of the pains incident to diſeaſes which diſpoſe or lead to death, which without doubt are often very ſevere; but I only mean to enquire or examine, whether it is probable we feel any, or any very ſenſible pain, at that moment when the ſoul is ſeparated from the body. It is generally thought, that at that inſtant, a more intenſe pain is felt, than can be produced by all the torments a man is capable of inventing. Authors exaggerate this pain in books, orators in pulpits, and all ſorts of people in converſation, and reaſon upon it in the following manner. If, ſay they, tearing a nail from the finger, or a finger from the hand, produces a pain ſo acute, that a man is ſcarce able to endure it, what muſt he feel, or how will he be able to bear that which tears the ſoul from the body? Here the ſtrict union between theſe parts is deſcribed in the moſt feeling manner, in order to enhance or aggravate the ſenſation that muſt be experienced at their ſeparation; and they compare it to the final parting of two faſt or fond

fond friends, who have lived long and happily together; or to two integrant parts of an animated body, the diviſion of which is the more painful, the more firmly and intimately they are united together. To heighten this deſcription, they add, that this pain pervades all, and every one of the parts of the human body, both internal and external, becauſe the ſoul is torn equally from them all alike; which is a univerſality, that cannot exiſt in any other pain, becauſe he who is roaſted alive, or thrown into a great fire, does not feel pain in his entrails, at the time his external parts begin to ſcorch: agreeable to this mode of reaſoning, they conclude, that the pain which is felt at the moment of death, is enormous, beyond all imagination and deſcription.

LXXVIII. I ſee this matter in quite a different light, and look upon all this aggravated degree of pain to be imaginary, and conſider the reaſoning by which the exiſtence of it is attempted to be proved, as fallacious and deluſive. It is confounding our ideas of objects, to ſuppoſe that the diviſion of integral parts, is analogous to the ſeparation of the ſoul from the body. The pain in the firſt inſtance, conſiſts in the forcibly breaking their connexions, or in the firſt ſhocks of the violence, which diſ-

poſes to their diſunion. In the ſeparation of the ſoul from the body, there is no inſertion of material fibres to be torn out by the roots, nor any diviſion to be made of connected ſubſtantial parts. From whence then can bodily pain be derived?

LXXIX. The uſing the ſame words promiſcuouſly, cauſes mankind to run into infinite errors, and eſpecially if the application of them is made to things that are fundamentally very different. The expreſſion *tearing the ſoul from the body*, faſcinates or miſleads many people in the buſineſs we are now treating of; the phraſe ſhould be underſtood in a figurative ſenſe, and we are apt to conſtrue it in a ſtrict or literal one. In conſequence of which, as we know we can't tear from our bodies, the moſt minute ſhred, without feeling great pain, or even extract any foreign ſubſtance, that has been violently introduced into, and ſticks in any part of our frame, without being liable to the ſame ſenſation; led away then and betrayed by the ſound of the expreſſion, we are apt to imagine, that ſomething ſimilar happens in the ſeparation of the ſoul from the body; but the ſoul is a pure ſpirit, that can neither adhere, or be made to adhere to any body whatever, nor can it be bound to it by ligatures, nor united with it by fibres,

fibres, nor fixed to it by any kind of faſtening, nor intangled with it by any kind of roots or inſertions; and finally, the mode of its union to the body, is incomprehenſible to all our philoſophy or underſtanding; and conſequently, a deſcription of its diſunion cannot be given in the words of any language. There is no doubt, but the term *tearing from* is metaphorical; and that we might with leſs impropriety, although we never can with propriety, in deſcribing the ſeparation of the ſoul from the body, ſay, that it evaporated off, it was diſſipated, or that it had been exhaled, than that it had been torn away; for its diſunion from the body, is performed by a movement that is ſupremely inſenſible, becauſe on the part of the corporeal ſubſtance, there is not the leaſt reſiſtance made to its flying off. Vapours are continually exhaling from every part of our bodies, without giving us the leaſt pain. And why is this? Why it is, becauſe that on account of their thinneſs and delicacy, they find no oppoſition in their paſſage, either from the ſolids, or the pores of the ſkin. What obſtruction then can you ſuppoſe the ſoul meets with, in its exit from the body, which is infinitely more ſubtil and thin, than the fineſt vapours?

LXXX. Let us contemplate the thing in another point of view; and admit that the ſoul at

at the time of its being ſnatched away from the body, cauſed a violent ſhock, like that of tearing to pieces all the entrails, and inverting the whole interior organization. I ſay that even ſuppoſing this, the pain that it would occaſion would be very ſlight, or next to nothing; and the reaſon is, becauſe that in thoſe ultimate ſtages of life, all the faculties are ſo extremely languid, and the operations of nature ſo feeble and remiſs, as hardly to be perceived; and the ſenſation of pain, which is one of thoſe faculties, being in the ſame ſtate with the others, and the agent which is to ſtimulate them being equally feeble with the reſt; although in the time of vigour, it was capable of exerting a force that had the power of producing great pain, in the preſent ſtate of things, it is not capable of giving a ſhock that can excite any very acute ſenſation, nor if it was, is the ſubject it is exerciſed upon capable of perceiving, or being violently affected by it.

LXXXI. I am inclined to think, that a few moments before death, there comes on a kind of half death, or ſtupor, that is ſomething like a lethargy or ſwooning, and that in this interval, there remains no kind of recollection or reflexion; and it is probable, that the morning of our life, and the evening of our death, are preceded

ceded by a ſort of crepuſcules or twilight, which brighten and grow clearer as the day of our life comes on, and which darken and grow more obſcure, as the total night of our death draws near.

LXXXII. Hitherto we have been treating of natural deaths; but violent deaths, which do not happen till three or four days after receiving the injury that occaſions them, may be conſidered to come under the deſcription of natural ones; as we may ſuppoſe thoſe people die in the ſame way, that thoſe do who are carried off by an acute diſeaſe.

LXXXIII. Sudden violent deaths, which are ſo much dreaded, are the leaſt painful of all; and indeed I was about to ſay, that people in ſuch caſes, hardly feel any pain at all, or at moſt but an inſtantaneous one; becauſe the operation of the cauſe which induces them, takes away in a moment, all ſenſe of feeling. It is well known, that thoſe who have fallen from a great height, and have lain a conſiderable time afterwards as if they were dead, have, when they came to themſelves, affirmed, they did not feel the blow they received upon coming to the ground. The great Chancellor Bacon, tells a ſtory of a gentleman who was very deſirous of knowing

knowing what people felt who were hanged, and in order to be ſatisfied about it, determined to make an experiment of the thing on himſelf. For this purpoſe, he faſtened a rope to the cieling of a room, in which rope he made a nooſe, and after adjuſting it to a proper length, he ſtood upon a ſtool, and fixed the nooze round his neck, in the expectation, that after ſuffering himſelf to be ſuſpended, he ſhould be able to recover the ſtool again; but the good gentleman was a little out in his calculation; for if it had not been for a friend who was preſent, to whom he had communicated what he intended to do, and who cut the rope in time, the experimental philoſopher had been as dead as if he had been executed by the hands of the hangman. The account he gave of this matter was, that from the moment his body became ſuſpended by the rope, he loſt all ſenſe and recollection; that he had not the leaſt remembrance of the ſtool, or apprehenſion of the danger he was in, nor even any ſenſation of pain, ariſing from the ſuffocation that was brought on.

LXXXIV. This, I firmly believe, is what happens to all thoſe who are executed by the hands of juſtice, whether they are hanged, ſtrangled by the bow-ſtring, or beheaded; and in general, to all thoſe who ſuffer violent deaths that

that are as ſudden as theſe are; for they can only feel a momentary or inſtantaneous pain, and the inſtant they receive the fatal blow, they are from that time, to the ſeparation of the ſoul from the body, mere effigies of men, and have no more ſenſation of pain, than ſtocks or ſtones; and notwithſtanding, that between the intermediate ſpace of their receiving the blow, or in caſe they are hanged, of being turned off, they are ſeen to make ſome convulſive motions, theſe motions are merely mechanical, and are by no means governed by the will, or directed by reaſon.

LXXXV. We will not exempt, as coming under this general rule, even thoſe who are burnt alive. This is a ſort of puniſhment, which ſtrikes all the world with extreme horror, becauſe they generally conceive, that from the inſtant a perſon who is executed in this way, is thrown into the fire, to the time of his reſigning his laſt breath, he feels the excruciating torments of the fire. But I am of opinion, that he feels nothing after the firſt minute that he is committed to the flames; nor can I conceive, that his perception of pain can endure even ſo long as that.

LXXXVI. I think I have tolerably well proved, what I at firſt aſſerted; but as the reader may

may object, that this paradox ought to have been claſſed among phyſical matters, inſtead of among moral and political ones, I will endeavour now, to remove this objection; which I hope I ſhall be able to do, notwithſtanding the decadence of the faculties, and the want of ſenſation at the moment of death, are properer objects for philoſophical, than moral ſpeculations. I ſhall begin with obſerving, that we ought to diſtinguiſh between the matter of the proof, and the eſſence of the ſubject we are handling. The ſubject in the preſent caſe, conſiſts in a theoretical propoſition, that death with reſpect to what there is ſimply and merely in the thing itſelf, ought not to be feared, or that the fear of death, conſidered in this manner, is not reaſonable or well-founded; now thus conſidered, the queſtion is purely a moral one, becauſe it directly combats an inordinate paſſion of the ſoul. The proofs of the truth of the propoſition, appertain to philoſophy; but this is what we ſee happen every day with regard to other moral queſtions. When the queſtion is, whether a marriage ſhould be diſſolved on account of imbecility, all the proofs in the trial are purely phyſical, &c.

LXXXVII. But the queſtion more immediately appertains to morality, on account of the end

for which I propoſed it, than it does with reſpect to its own proper matter; for this end is a point of morality of the moſt ſerious importance. There is great neceſſity for baniſhing this panic terror, and this diſmal apprehenſion of the tormenting pains of death. It is very common to ſee dying people (and I ſpeak of what I have known and experienced myſelf) extremely diſtreſſed by this idea, not ſo much on account of the dread of the exquiſite pain itſelf, as on account of the conſequences that may reſult from it. They figure to themſelves, that the pains which terminate this mortal life, are ſo extremely intenſe, that they will occaſion them to loſe all patience, and prevent their ſubmitting themſelves to the will of Providence with the chriſtian reſignation they ought; and are alſo apprehenſive, that it would cauſe them to break out into furious acts of deſperation. This anxiety has ſuch an effect on them, that it prevents the operation of thoſe chriſtian diſpoſitions, that ſhould accompany a man in his laſt moments, and which are ſo neceſſary to promote his dying a good death; and beſides this, they even put him in danger of diſtruſting the Divine Goodneſs at ſo critical a period. I have ſeen many who were in their perfect ſenſes, and who had been people of good and exemplary lives,

lives, who have been greatly diſtreſſed by this idea;

O genus attonitum gelidæ formidine mortis!

LXXXVIII. I ſuppoſe that ſentence of St. Paul's, *Fidelis autem Deus eſt, qui non patietur vos tentari ſupra id quod poteſtis*, in Engliſh, *God is good and juſt, and will not ſuffer you to be tried or tempted beyond your ſtrength*, would be an excellent antidote for this malady. The thinking otherwiſe of the Deity, would not be contemplating him, as a moſt merciful father, nor as a juſt God, but conſidering him as a cruel tyrant, who at the moment on which your eternal happineſs depends, ſhould afflict you ſo ſeverely, as to cauſe you to commit acts of deſperation. What faith, and the light of natural reaſon teaches us, is, that his goodneſs never permits the rigour of the trial, to exceed the power of the ſoul to contend with and reſiſt it; and as I obſerved before, this reflexion is an excellent antidote againſt the malady we have been ſpeaking of; but with all this, if it is not aſſiſted and enforced by the perſuaſive eloquence of an able friend, or a good paſtoral director, it is apt to loſe ſome of its efficacy, and not to quiet the fluctuations of the mind ſo thoroughly as could be wiſhed, and eſpecially if not attended to in time; and I therefore think that it would be neceſſary

neceſſary, whether ſick or well, for all people to remain in a firm perſuaſion, that theſe excruciating pains in the article of death are imaginary.

Appendix to the foregoing.

LXXXIX. I have ſometimes obſerved, that thoſe who attend on dying people have been much dejected upon finding them in their laſt moments, make ſome very irregular and extraordinary motions, and have been afraid and believed that thoſe agitations, had proceeded from ſome impatience that had ſeized them. But let them not be uneaſy on this account; becauſe it is moſt likely, that theſe motions are merely mechanical; and that in caſe they ſhould not be ſo, there is no miſchief to be apprehended from them; for in that proximate ſtate to death, if people are not deprived of their ſenſes, the uſe of their reaſon is ſo feeble, or ſo confuſed, that very little, if any, of that free will can be exerciſed by them which is neceſſary to conſtitute ſin, or at leaſt any ſerious ſin; for no intoxicated man, nor any one at the inſtant he awakes from a profound ſleep, can be in a more ſtunned or ſtupified ſtate, than a dying perſon at ſuch a criſis.

XC. Finally, both with reſpect to the matter of this appendix, as well as with regard to that of the ſubject of this Eſſay, I ſhall proceed to give a laſt, and moſt efficacious conſolation, againſt the apprehenſion, that the extreme pains of death are likely to endanger the loſs of people's ſouls; for admitting that thoſe pains were real, and as ſevere as they are repreſented to be, is there any danger that the dying perſon who is oppreſſed by them, ſhould fall into the ſerious ſin of impatience, or that he ſhould incur the guilt of any other mortal crime? To this, I reſolutely anſwer that he could not; for the ſame reaſoning that ſtates the pain to be ſo inſufferably intenſe, removes all the hazard of ſinning, becauſe it muſt diſturb the underſtanding to ſuch a degree, as to deprive a man of all free will. This is a conſequence reſulting from all paſſions that are exceſſively violent, as is agreed by all philoſophers and theologians. Virgil, who had great judgment and penetration in theſe matters, repreſents Chorœbus, who had been totally deprived of his ſenſes by grief for the impriſonment of his beloved Caſſandra, as diveſted of all free will or reflexion alſo, in the following lines:

Non tulit hanc ſpeciem furiatâ mente Chorœbus,
Et ſeſe medium injecit moriturus in agmen.

PARA-

PARADOX X.

The desire of posthumous fame is vain and futile.

XCI. There is no appetite or craving of man can be more irrational, than that, which is directed to an object he can never taste of or enjoy; and such a one, is the desire of having his name become famous in the world after his death. When a man is dead, every thing here that respects himself dies also; and what advantage can it be of to him after his decease, that all the world burst forth in acclamations and applauses of his great deeds and talents? The smoke of all this incense vanishes in the air, nor can the least particle of it, touch or affect him to whom it is offered. He feels no more of the praises of his virtues, than a statue; nor is he any more sensible of the celebrations of his grandeur, than an edifice that is erected to perpetuate it. If his works were pleasing in the eye of God, and he is in the regions of rest, he may feel the satisfaction of having left a good example to the world; and all that passes out of that sphere, let the celebrations of the world be what they will, can be of no avail to him. He will either despise, or be totally ignorant of the eulogiums that are be-

ſtowed on him by mortals. What convenience or what ſatisfaction, do either Alexander and Cæſar now enjoy, from being applauded through the globe for the two moſt illuſtrious warriors of the world? Homer and Virgil, from being celebrated as the two moſt elegant poets? and Cicero and Demoſthenes, from being admired as the two moſt eloquent orators? They are perhaps entirely ignorant of all that is ſaid of them here; and if they are permitted to know it, it is moſt likely, that ſuch knowledge tends more to torment than pleaſe them. Empedocles was certainly a great mad-man, if, according to what ſome have ſaid of him, he precipitated himſelf into the flames of Mount Ætna, in order that the world upon not finding his body, ſhould imagine he had aſcended up to heaven, and would worſhip him as a deity. This philoſopher however, as he was a follower of the Pythagorean ſyſtem, and believed the tranſmigration of ſouls, might expect, that by his being placed ſucceſſively in a variety of bodies, he ſhould hereafter view with great pleaſure, the worſhip and adoration that was paid to him in this world; but what enjoyment of this ſort can a man hope for, who believes that when he leaves theſe regions, he ſhall never return to them again? And what can it be to ſuch a man, whether he is worſhiped or for-

gotten? Thus the emperor Adrian was much madder than Empedocles, who without believing in the doctrine of tranſmigration, erected temples and altars, and appointed prieſts, making proviſion at the ſame time for maintaining them, and providing victims to be ſacrificed to his infamous little idol Antinous. Of what ſervice could all this be to that diſgraced and unfortunate boy? And we may make the ſame obſervation, on the apotheoſis and ridiculous deification of the Roman Emperors. Veſpaſian, although he expected this farce after his death, would be played over with reſpect to him, treated the thing with the ſcorn it deſerved, by ſaying to thoſe who ſurrounded him when he was near his end, *I feel as if I was going to be converted from a man into a deity.*

XCII. That mankind ſhould be deſirous of ſeeing themſelves applauded, and their names honoured while living, ſeems very natural, becauſe they may find a gratification in it; but that they ſhould be anxious for poſthumous honours, which they can neither taſte or enjoy, ſeems to beſpeak a diſordered imagination, and a diſtempered brain. Ovid paints Sappho, as feeling great ſatisfaction, at ſeeing her muſe celebrated by all the world.

At mihi Pegaſides blandiſſima carmina dictant;
Jam canitur toto nomen in orbe meum.

Thus far he expreſſed himſelf very properly, becauſe he ſpoke in the name of Sappho while ſhe was living, and might be ſuppoſed to be gratified by, and pleaſed with the aromatic fumes of thoſe acclamations. But he reaſoned very ill, when ſpeaking of Hercules and Theſeus, he reckoned as a balance for the loſs of thoſe heroes, the applauſes the world would beſtow on their memories:

Occidit et Theſeus, et qui tumulavit Oreſtem;
Sed tamen in laudes vivit uterque ſuas.

XCIII. The eulogiums of the dead, can only be enjoyed by the living. The relations, the friends, and the country of the deceaſed, divide among themſelves the whole fragrancy of this grateful gale, nor can the leaſt breath of it reach the region, which is inhabited by thoſe who depart hence. There remains to the dead but one happy lot, and that is derived from, and depends on their having died well. *Beati mortui, qui in Domino moriuntur.*

PARA-

PARADOX XI.

There is no man of a clear and good underſtanding who is not a good-intentioned one.

XCIV. I believe that all the mortals in every quarter of the Globe, will be ſtruck with ſurprize, at hearing me broach this paradox, and will look upon it as one of the greateſt chimeras in ethics, that ever entered the head of man; for there is ſcarce any one of the leaſt obſervation, who cannot affirm and atteſt, he has ſeen and known people of very good capacities, who were very perverſe and ill-diſpoſed. But I, in oppoſition to all this, aſſert that I never met with ſuch a one; and I not only make this declaration, but declare further, that I think it next to impoſſible that there ſhould be ſuch a man, and that if by chance ſuch a one ſhould be found, he ought to be conſidered as a monſter.

XCV. But in order that we ſhould not miſunderſtand or confound things, I think it neceſſary for me to explain, what I underſtand by an evil-intentioned man. By an evil-intentioned man, then, I mean ſuch a one in whom thoſe vices reign, which are moſt pernicious to ſociety, that is to ſay, malignity of heart, unforgivingneſs,

turbulence or reſtleſſneſs, and a deſire of uſurping other peoples property; and in general, all ſly and crafty perſons ſhould be enumerated in the catalogue of evil-intentioned men, ſuch for example, as are attentive to nothing but their own gratifications and emoluments, and who have not the leaſt concern for, or who are totally indifferent about the good of their neighbour, or the welfare of the public.

XCVI. The deformity, the baſeneſs, and the diſſonance from natural reaſon, there is in a perſon's doing a voluntary injury to another, is ſo ſtrikingly repreſented to a man of a clear and a ſound underſtanding, that except in here and there an inſtance, where ſome violent paſſion intervenes to diſturb and diſorder the reaſon, it ſeems impoſſible, that a perſon ſhould voluntarily commit acts that are directly injurious and offenſive to his neighbour. And it may be from this principle, that we have ſeen ſome who have been reputed as atheiſts, who, notwithſtanding their erroneous belief that there is no ſuch thing as future rewards and puniſhments, and that they expect no recompence for their good actions, or chaſtiſement for their bad ones hereafter; as members of human ſociety, have behaved well, or at leaſt have done no civil miſchief to it; I mean that they have conducted themſelves

themſelves like quiet peaceable people, and have lived contentedly upon their own patrimonies, or on what they have lawfully acquired, and have ſhewn themſelves averſe to all violence and injuſtice. Such among the antients, was Pliny the elder; and ſuch among thoſe of more modern date, was the Engliſhman Thomas Hobbes.

XCVII. The genuine and true reaſon of this is, that the exiſtence of a Supreme Being, although it is moſt plain and clear, is not with reſpect to the human underſtanding, ſelf-evident, or, as the Theologians explain the thing, is not *per ſe nota quo ad nos*; but is made infallibly evident, by deductions drawn from other principles; and where a deduction of this ſort is abſolutely neceſſary, a perſon may ſuſpect, that it is very poſſible now and then ſome fallacy may creep in. But the deformity of ſuch vicious actions as we have been ſpeaking of, is evident of itſelf; and whenever ſuch actions are repreſented to the underſtanding, it clearly comprehends their baſeneſs, and the operation of them is odious and apparent in the eyes of every man, unleſs as we obſerved before, ſome circumſtance intervenes to diſturb his reaſon.

XCVIII. To

XCVIII. To this it may be urged by way of objection, in the firſt place, that in order to perceive and be convinced of the turpitude of thoſe actions, there is no neceſſity for a man to be poſſeſſed of a bright underſtanding, as a middling one, or even one below the middle claſs, would be ſufficient for this purpoſe; ſo that this reaſoning will prove the turpitude to be plain to every underſtanding, high, middling, and low, or elſe that it is evident to neither of them.

XCIX. To this I anſwer, that although the thing may be known with intire certainty to every one of them, there is a great difference between the knowledge and comprehenſion of one man, and that of another. Two underſtandings that are unequal, notwithſtanding they may both know, and be thoroughly perſuaded of the ſame truth, may be ſtruck with it very differently; and in proportion as one of theſe underſtandings is the moſt clear, that one will know it more diſtinctly, more ſtrikingly, and with a more refined degree of penetration; and in proportion as the other is leſs clear, that other will perceive it leſs diſtinctly, and more confuſedly. In conſequence of this inequality of underſtandings, objects make a more ſtrong or a more weak impreſſion on the ſoul, and have more or leſs influence to excite in it, theſe, or thoſe affections.

The

The ſame infinite goodneſs of God which is known to the bleſſed, is known with infallible certainty by the worldly alſo. How then comes it to paſs, that the firſt love him neceſſarily and intenſely, and that we worldly mortals are ſo luke-warm in our love of him? This is occaſioned by no other cauſe than the following, that although our knowledge of him is evident, that of the bleſſed is the moſt clear, and ours the moſt obſcure; and in proportion as the underſtanding knows a good or an evil with greater clearneſs, the will is moved with a greater impetus, to love the firſt, and abhor the laſt.

C. This may be very opportunely and aptly explained, by the operation of any corporeal ſenſe; for he whoſe olfactory nerves are very quick, will be more offended with an ill ſmell, than one in whom that ſenſation is more languid and remiſs; and although this laſt may be able clearly to diſtinguiſh the ill ſmell, he will be leſs diſguſted at it; nor will it appear ſo hateful to him; and this happens from no other reaſon, than that the olfactory perception of the firſt is very clear, and that of the ſecond rather obſtructed or more dull; and although not only the man who has a very quick and delicate ear, but alſo he who has one that is more

more obuſe, may evidently perceive the diſſonance of three or four voices which are totally diſcordant; the laſt will bear it without being much affected, and the other will be almoſt diſtracted by it; and this is all derived from the cauſe above-mentioned.

CI. And it happens juſt ſo with regard to intellectual perception. The deformity of vicious actions, which are ſelf-evident, is apparent and clear, not only to men of perſpicuous underſtandings, but to thoſe of the moſt inferior capacities, provided they are not quite ſtupid; but by the firſt perceiving them with a lively clearneſs, and the others ſomewhat confuſedly, they produce a kind of horror in thoſe who have that clearneſs of perception, which does not permit their wills to embrace ſuch objects; while thoſe to whom they do not appear ſo diſguſting and unpleaſant, may be betrayed into graſping turpitudes, under the diſguiſe of delights and pleaſures. But I would not have it underſtood that I mean to inſinuate by what I have ſaid here, that there ever is a ſuſpenſion, or obſtruction of the operation, of every, or any man's free will.

CII. It may be objected in the ſecond place, that there are entire nations, among whom it cannot

cannot be denied, that there are to be found many men of excellent underſtandings, who hold robbery, deceit, and even cruelty to be lawful, and that conſequently, they cannot conſider theſe things as turpitudes, or have a juſt ſenſe of their baſeneſs. To this I anſwer, that our aſſertion with reſpect to a good underſtanding, does not allude to one placed in ſuch a ſituation. The general error of a nation in any matter whatever, is like a dark fog which bewilders people, cauſes them to miſtake their way, and perplexes the cleareſt underſtandings. If in early infancy, when the rational faculties are weak, children are familiarized to, and brought up under the influence of deceitful prejudices; and when they come to years of maturity, they are accuſtomed to reverence a common error as irrefragable authority; if it ſhould happen afterwards, that a ray of light breaks in upon them, which diſcovers to them the truth, they timidly fly from the elucidation, diſtruſt their own reaſon and reflexion, and are apt to ſuſpect ſuch elucidation to be a deluſion, and to ſuppoſe that it would be criminal in them to regard it.

CIII. I anſwer ſecondly, that it is not known with any degree of certainty, that men of excellent underſtandings, who are educated and brought up in thoſe nations we call barbarous, are infected with all the errors that prevail in thoſe nations; and with reſpect to myſelf, I am fully

fully perſuaded they are not. We know that various eminent men among the Gentiles, in matters of religion, thought very differently from the populace. It is true however, that there were but few of them who had ſufficient reſolution to ſpeak out, as they for the moſt part diſguiſed their opinions, from motives of fear or policy. We ought alſo to admit, that among the barbarous nations of theſe times, there are ſtill to be found men of this character. Nor is there any neceſſity for limiting ſuch an opinion within the bounds of mere conjecture; for there are various hiſtorical relations, which bear teſtimony to actions of heroic virtue, that have been lately done by ſome of the individuals of thoſe very nations, where maxims of inhumanity are prevalent at this day; of which if it was neceſſary, a long catalogue might be adduced.

CIV. In the third place, it may be objected, that experience teaches us, there is ſcarce a country or populous city, where you may not find ſome people of perſpicuous underſtandings, and who, although they are of wayward diſpoſitions and depraved inclinations, are ſubtil and penetrating. To this I anſwer reſolutely and determinedly, that I defy any man to produce ſuch an inſtance. I have known and converſed with

with many of thoſe people, who have been eſteemed men of good underſtanding, and perverſe diſpoſitions, but have always found the common opinion of thoſe perſons to be extremely erroneous. The vulgar frequently look upon perſons of very ſuperficial talents, as men of great underſtanding; and upon hearing them talk off hand, although there is nothing ſolid in what they ſay, and obſerving in them a readineſs at expreſſing themſelves, and more eſpecially if they deliver themſelves with confidence, and a magiſterial air, moſt people are apt to give them credit for being men of admirable underſtandings; when in truth, there is hardly one out of a hundred of them, who can penetrate more than ſkin-deep into the objects he converſes upon. There is another very common deception in this matter, and that is, looking upon cunning people as men of depth or penetration, when they are as palpably different from one another, as light is from darkneſs. I call thoſe cunning people, who are ſolely attentive to nothing but their own concerns, and who by all ſorts of underhand ways and means, and by all kinds of little arts and deceits, are endeavouring to promote their own particular intereſt. Can theſe be called men of ſublime underſtandings? To do this, requires but little depth or penetration, as

all

all that is neceſſary to accompliſh ſuch ends, is low craft and roguery; and there is hardly any capacity, be it ever ſo mean, which cannot comprehend and apply ſuch trivial artifices: every one may arrive at doing this; but a noble underſtanding, diſcerning the baſeneſs of them, abominates ſuch practices; although the vulgar, to whoſe baſtard diſpoſitions they are better ſuited, embrace them with eagerneſs. Diſſimulation, ſo far from requiring an exalted underſtanding to ſupport and carry it on, requires none at all, for we ſee ſome irrational animals who exerciſe it with great addreſs. The foxes are very expert at it, but that does not in any wiſe render their nature ſuperior to that of brutes; and I repeat again, that I never knew an underſtanding that had any thing of the elevated or ſublime in its compoſition, that did not abhor all duplicity and fraud.

CV. If we ſee this matter in the other extreme point of view, we ſhall find it liable to great equivocation. It frequently happens, that a man of very pure virtue, who has ſomewhat of native dryneſs or bluntneſs in his compoſition, appears to thoſe of rude and uncultivated capacities, as a perſon of a depraved diſpoſition. Thoſe who are zealous lovers of truth and juſtice, are accuſtomed, not always to accommodate themſelves

themſelves to thoſe courteous condeſcenſions, by which people acquire popular acceptation; as by attending to the ſubſtance of things, they are apt to overlook forms and ceremonies. Words from their mouths, ſignify what the ſound and ſenſe of them expreſs: they conſider courteous diſſimulation as a treacherous enemy of virtue; and are ignorant of the art of painting vice in counterfeit colours, for the ſake of pleaſing or flattering any man; but on the contrary, are always careful to deſcribe it ſo, as that it may appear in its true native ſhape, and in all its deformity. The more prevalent lying, deceit, and perfidy is, the more they loath and nauſeate it, and are obſerved to be more ſtrict and ſevere in their reprehenſions of it; and beſides, they never look ſmilingly, but upon thoſe in whom they perceive a clean mind. This unpleaſing integrity, is regarded by the bulk of the world, as a kind of miſanthropy, or malevolence towards the generality of mankind; and the number of thoſe, who buſy themſelves in painting ſuch men, as impracticable, perverſe, and ill-intentioned is infinite; for they are pleaſing but to very few, as there are but few who are pleaſed with them; ſo that either from the malice of their opponents, or from the want of a proper knowledge of the world in thoſe that are indifferent with reſpect to their opinions of

them, it eaſily comes to paſs, that a man of exalted and ſincere virtue, is often looked upon by a whole town, as a perſon of intentional milignity.

CVI. Whoever is upon his guard not to fall into one of the two beforementioned errors, and has capacity to diſtinguiſh true virtue from falſe, and a clear and good underſtanding, from a cloudy, crooked, or crafty one, will be convinced as I myſelf have been convinced, that there never fails to be much virtue lodged in the perſon, in whom you find a real good and clear underſtanding. I would not however be underſtood to inſinuate, that all men of great genius and capacity ſhould be ſaints; for meritorious virtue, or ſuch as entitles a man to inherit eternal life, is the child of grace, and not of nature. Neither would I be underſtood to ſay, that all kinds of moral virtues ſhould be reſplendent in ſuch a man as I have been deſcribing, but only thoſe, whoſe oppoſite vices, at firſt ſight, and without the aſſiſtance of any reaſoning or reflection, are manifeſt and apparent; and whoſe deformity, at a glance, ſtrikes the eye of every beholder; nor would I even be underſtood to aſſert ſo much as this, without ſome limitation and exception; for every vehement paſſion during the time it laſts, will make the

the moſt prudent man act like a mad one, and the moſt acute one, like a fool; but abſtracted from the intervention of ſuch accidents, it is my firm opinion, that every man of a clear and good underſtanding, is an honeſt and a good-intentioned one.

THE GREAT AND MASTERLY AUTHORITY of EXPERIENCE.

SECT. I.

I. THERE arrived in the kingdom of Cofmoſia, two famous women, who were very oppoſite to each other; but both with the ſame deſign, which was that of obtaining the abſolute dominion over that empire. The firſt was called Solidina, the other Idearia; the firſt was learned, but ſimple; the ſecond ignorant, and oſtentatious. The people of the country, were ignorant like the laſt, and ſimple as the firſt. Hence, Solidina thought to win them to her by kindneſs, and by inſtructing them; and Idearia, to ſubdue them by craft and impoſition. Idearia opened a public ſchool, and promiſed in pompous language, that in a very ſhort time, and with little or no trouble, ſhe would make all thoſe extremely learned and wiſe, who choſe to attend her lectures. The greatneſs of the promiſe, joined to the impoſing appearance of the new

new doctreſs, mounted in the profeſſional chair, together with her great volubility, and flow of mountebank rhetoric, ſoon filled the ſchool with pupils. She began her lectures, which all conſiſted, in laying before her auditors in new and unuſual language, the chimeras, contained in the extenſive field of the imagination. And, oh wonderful to relate! either Idearia had ſomewhat of enchantment about her, or elſe there was ſomething very ſingular in her method of applying her artifice and cunning; for in a few years after opening her ſchool, ſhe perſuaded thoſe miſerable people, they perfectly underſtood all that could be learned.

II. Solidina, purſued a courſe diametrically oppoſite to that taken by Idearia. In an humble garb, and without any parade or oſtentation, ſhe went from houſe to houſe, and familiarizing herſelf with all men, taught them in plain and eaſy language, true and uſeful documents. The moſt retired cottages, and the moſt humble work-ſhops, were ſchools ſuited to her doctrines, for ſhe found in all of them, ſenſible objects, which examined by the help, or auxiliary aid of the underſtanding, ſerved the purpoſe of books for teaching and explaining her leſſons; and ſo far was ſhe from inſpiring an indiſcreet preſumption in her diſciples, that ſhe ingenu-

ouſly told them, that all ſhe taught, was a mere trifle, compared to the infinite deal there is to be learned; and that to arrive at a moderate knowledge of things, required infinite labour and application. This modeſty of Solidina's, was very prejudicial to her, becauſe at the very time ſhe made this declaration, Idearia, was boaſting and blazoning in her ſchool, that in a conciſe mode, and with very little trouble, ſhe would make all her auditors univerſally learned; the conſequence of which was, that the pupils of Solidina one after another began to drop off, and go over to Idearia, in hopes that in her ſchool, they ſhould arrive at the ſummit of learning *per ſaltum*. What contributed much to forward this defection, was, that Idearia alſo ſpoke of Solidina with contempt, calling her baſe, vile, mechanical, and ſtupid; by which means, the poor tutreſs became abandoned by all the people of rank, and was obliged to retire from the city to the villages, where ſhe applied herſelf to inſtructing poor huſbandmen, in that ſort of knowledge, that was neceſſary and uſeful, for the cultivation and improvement of their lands.

III. Idearia by the baniſhment of her rival, now becoming triumphant, entertained thoughts of eſtabliſhing an abſolute and deſpotic ſway

over her disciples; and to accomplish this purpose, she published an edict, by which every one was required not to believe in future, aught he should see with his eyes, or touch with his hands, but only to credit such things as she should be pleased to order him to believe; requiring further, that he should look upon it as an indispensable obligation, always to defend with invincible obstinacy and unremitting vociferation her doctrines, against whoever should presume to contradict them. All heads bowed obedient to this tyrannic decree, and people began firmly to believe many maxims, which before they had found a difficulty in assenting to; such for example, as that the truth can never be found out or ascertained but by means of fiction; that there is a mode of coming at the knowledge of things, which may be taught to a child in four days; that mankind are all alike, which is a rule that will hold good with respect to every other species, and if you know what one of a sort is, you know what they all are; that insensible and inanimate things, have their desires, their prejudices, and their affections, the same as animate ones; that that body, which is the most brilliant, and most heating of any, has nothing igneous in its composition; and that on the other hand, there is another very large body, which is purely igneous, that is neither lumi-

nous, nor heating, nor does it ſtand in need of any pabulum to ſuſtain it; that all living creatures have a large portion of fire in their compoſition, without excepting even the fiſh, although they are always in or under the water, nor the turtle, whoſe blood is poſitively cold.

IV. Theſe and many other ſuch-like portentous particulars, did Idearia teach to, and impoſe on her credulous diſciples; who all received and embraced them as infallible truths; but at length there aroſe in the very ſchool of the doctreſs herſelf, a contentious ſchiſm, or ſcandalous diſagreement, which was begun by one Papyratius, a man of ſubtil and animated genius, but a great lover of novelties. This man introduced new and not leſs aſtoniſhing dogmas than the others; ſuch as that all the living creatures in the world, man only excepted, have no more ſenſation or feeling than ſtocks or ſtones; and that in every man, there is but a very ſmall portion of the body which poſſeſſes the preſence of the ſoul; that the extenſion of the world is infinite; that the motion of ſublunary bodies, is equally ſemper-eternal with that of the cœleſtial ones; that the imaginary ſpace, is really and truly a body; that every thing upon the face of the earth, is in ſo continual and rapid a motion, as in the ſpace of every twenty-

twenty-four hours, to travel ſome thouſands of leagues; that we in all things, ſhould give credit to our imaginations, but none to our ſenſes; for that the repreſentations made by theſe laſt, are apt groſsly to deceive us; and that neither is the ſwan white, or the crow black, nor is fire hot, or ſnow cold, &c.

V. Theſe novelties, and others of the ſame ſort, although they were condemned from the beginning by the majority of Idearia's diſciples, did not fail to attract a number of votaries, ſufficient to form a new ſchool. The two parties inveighed againſt each other with great bitterneſs, and one ſide reprobated as abſurd errors, what the other maintained as concluſive dogmas.

VI. This diviſion, after long and obſtinate diſputes, in which the arguments were ſo nearly poiſed in equilibrium, that neither ſide could claim the victory, in the courſe of time, opened the eyes of many, and made them doubt whether they had not lightly, or even blindly, admitted as articles of human faith, doctrines, that were uncertain, and expoſed to be terribly conteſted. They obſerved, that the arguments with which each ſide attacked the opinions of their opponents, were beyond compariſon ſtronger, than

than the reaſons with which they defended their own. From hence they inferred, that both the one and the other were evidently doubtful, and might very probably be falſe. This brought to their remembrance the poor and neglected Solidina, and made them reflect, that ſhe proved all ſhe advanced, by ſenſible and plain demonſtrations. This remark becoming every day more general, and more adverted to by men of the firſt-rate ingenuity in the ſchools; they took the matter into conſideration, and the reſult of their deliberations was, a determination to recall Solidina from her retirement, and to bring her back to the city; which after having done with ſolemn pomp, they erected a magnificent ſchool for her, where ſhe has continued to teach from that time, with a reputation that has increaſed daily; and her being favoured with the countenance and protection of ſome illuſtrious perſonages of high rank, has greatly contributed to advance her credit, and particularly the encouragement ſhe has met with from the princes, Galindo and Angloſio, who are both great lovers, and patrons of Solidina.

SECT.

SECT. II.

VII. This Hiſtory, which was printed in French, was given me to read by a ſtranger who was on his travels; but as ſoon as I had read what I have juſt related, he ſnatched the book out of my hands, and aſked me if I comprehended what I had read? The queſtion gave me to underſtand, there was ſomething myſterious in the Hiſtory, and that under the plain letter, was conveyed ſome ſignification, different from what the words expreſſed. I anſwered him, that I had not underſtood it in any other ſenſe, than what the language ſeemed to imply; but that if he would permit me to read it over again with a little attention, I might perhaps be able to comprehend its meaning. He gave me leave, and then upon reflection, firſt on the nature of the doctrines it mentioned, although they were not pointed out very clearly, and ſecondly, on the alluſion of the names given to the perſonages who were introduced into the ſcene, I found it was not very difficult to decypher the riddle, which I interpreted in the following manner.

VIII.

VIII. The kingdom of *Cosmasia* is the world, which is the signification of the Greek word *Cosmos*. *Solidina* is experience, and *Idearia* imagination. These names are very properly suited, both to the characters and doctrines of the parties. Experience *solidly* proves her maxims, by sensible and clear demonstrations; and imagination, grounds her opinions on the vain representation of her *ideas*. Solidina was a long while banished, and during all that time, Idearia reigned triumphant; for from the period that Pythagoras reduced all philosophy to his numbers, Plato to his ideas, and Aristotle to his precisions; and for many ages afterwards, the world knew no other but an ideal physic; nor did it pay the least attention, to the experimental or solid. In the first maxims of Idearia, we perceive many of the dogmas of the peripatetic doctrine, and in her second, many of the Cartesian ones; and they gave the name of Papiratius to the broacher of this last system, because the French word *Carte*, signifies the same as the Latin word *Papyrus*, from whence the appellative was derived. Des Cartes is ranged among the auditors of Idearia, because he was disposed instead of less, rather more than the Peripatetics, to regulate all physics by imagination and ideas. At length the mistake of this

this method was perceived, and Solidina was recalled from the villages to the city; and experiment and obſervation, which for a long time had only been in uſe among the ruſtics, and employed in the buſineſs of huſbandry, to increaſe the product of the earth, improve the mountainous land, and to encourage the propagation, and mend the breed of herds and cattle; were not long ſince introduced in pomp, and countenanced by ſome courts, in the neighbourhood of which, academies were inſtituted, to examine nature by their help; and as the moſt celebrated of theſe, were the Academy of Sciences at Paris, and the Royal Society of London, which were founded under the protection of the kings of France and England, they called the two princes who were the lovers and patrons of Solidina, by the names of Galindo, and Angloſio, which were derived from the Latin words *Gallia*, and *Anglia*, which in that language ſignify France and England.

IX. The ſtranger approved of the whole, and every part of my explanation, and aſſured me, that by the context that followed what I had read, the intention of the author of that myſterious Hiſtory, could be no other than what I had deſcribed it. But I told him I was not inclined to approve, nor could I approve of the whole and

and every part of its contents; for that I obſerved in it ſome latitudinary expreſſions, which ſeemed to reflect upon, and were derogatory of the peripatetic doctrine, ſo I only acknowledged to him, that in the moſt eſſential parts, the thing ſeemed juſt and right. He replied, that as I was a Spaniard, and a ſectary of the peripatetic ſchool, my objection and the reaſons for it might be admitted. Upon ſaying this, he took his leave of me, and purſued his journey, leaving me in a diſpoſition to meditate on the ſubject of our converſation, and lay before the public, ſuch reflections as ſhould occur to me reſpecting the matter of it, which may be ſeen in the ſequel of this diſcourſe.

SECT. III.

X. The firſt thing that offers itſelf to our conſideration, is the little or no progreſs, which natural reaſon, unaſſiſted by experience, has made in the examination of the affairs of nature in the courſe of ſo many ages. Nature is as little underſtood in the ſchools at this day, as it was in the academies of Plato, of Lyceus, and of Ariſtotle. What ſecret have theſe academies developed? or what diminutive portion of this moſt extenſive country have they diſcovered? What

What utility has the labours of ſo many men of excellent ingenuity, as have cultivated philoſophy in the reaſonable and ſpeculative way, produced to the world? What art, either liberal or mechanical, of the many that are neceſſary for the ſervic of man, or the good of the public, do we owe to ſpeculative invention; and I might even ſay, what ſmall advancement in any ſuch art, has been derived from it? What document of the ſchools, has conduced to inſtruct a husbandman in the cultivation of his lands? They there talk much of cauſes, effects, productions, and diſpoſitions of matter, but all this has not yet produced any maxim that can be relied on, for the moſt advantageous mode of cultivating the land, in order to diſpoſe it to the production of this or that particular plant, nor to inſtruct us at what time it ſhould be ſown, nor in the leaſt to inform us with regard to many other circumſtances, that ſhould be attended to in the raiſing it. Schoolmen, after the example of Ariſtotle, treat largely of qualities, which they place in a predicament apart, or by themſelves; without having by this means, diſcovered any qualities at all, either in the mixtures, or the elements; but on the contrary, Ariſtotle has rather been miſerably miſtaken in thoſe he attempted to point out, by his rules of proportion and combination; I mean in thoſe that appertain to

to the air, and the water, as we have proved in another part of our works; and it would not be difficult to prove the ſame thing, with regard to thoſe he has aſſigned to the earth. If perchance he has been right in aſcertaining the the qulities belonging to fire, (although in our *Phyſical Paradoxes* we have denied his poſition with reſpect to its being hot in the higheſt degree) I ſay, if he has been right in this particular, it was not becauſe philoſophy had penetrated the ſecret, but becauſe the thing was manifeſted to us by our ſenſes.

XI. Theſe are the organs, by which all the natural truths we are able to obtain a knowledge of are conveyed to our ſpirits. Even in the mathematical faculties, which affect to confide every thing to theoretical demonſtrations, they cannot, except in the two elemental ones, arithmetic and geometry, ſafely advance a ſtep, without holding before them, the light of experience. It was this taught the geographer, the ſituation and poſition of the divers parts of the globe ; the navigator, the directive virtue of the loadſtone? the ſtatic philoſopher, the weight, the deſcent, and acceleration of motion in their deſcent, of heavy bodies; the mechanic and engineer, the augmentation of power by machinery, or the multiplication of purchaſe; the

aſtronomer, the movements and courſe of the ſtars; the muſician, the conſonant and diſſonant intervals of muſic; the optician, perſpective, or the effects of viſion when the eye ſurveys diſtant objects; to the catoptrician, and dioptrician, the laws of reflexion, and refraction.

SECT. IV.

XII. And it is very worthy of remarking, that even after experience had made thoſe firſt diſcoveries, on which the theory and practice of arts is founded, thoſe primitive lights were in general found to be inſufficient to enable the underſtanding to make further advances in them, but it was rather found to be neceſſary, that the ſame experience ſhould continue as they proceeded on, to direct their ſteps, and correct their errors. I will explain what I mean, by two examples taken from navigation.

XIII. The firſt regards the direction, or pointing of the magnetical needle to the pole. This admirable property, which was totally unknown to the antients, was diſcovered in the thirteenth century, and immediately applied to the improvement of navigation. Upon its firſt diſcovery, the philoſophers, according to their wonted cuſtom of pretending to diſcern the cauſes of things,

imputed this effect, as derived from an occult ſympathy with the pole, contained in the very eſſence, form, and ſubſtance of the loadſtone; and as this is ſuppoſed to be invariable, they concluded, that the direction muſt infallibly be invariable alſo. They continued in this good faith for about four hundred years, at the end of which long period, Crinon, a pilot of Dieppe as ſome ſay, or Cabot, a Venetian Navigator as others believe, was the firſt who obſerved the declinations of the magnetical needle from the true north, that is, that it did not always point directly to the pole, but declined in different places, ſometimes towards the weſt, and at others towards the eaſt. The philoſophers heard this novelty with great diſguſt, becauſe it gave the lye to ſome of their moſt eſtabliſhed maxims, and therefore they ſet about to contradict it with all their force. But in the end, they were obliged to ſubmit to repeated experiments, authorized and confirmed, by the teſtimonies of people of undoubted credit.

XIV. Having afterwards diſcovered, that under the meridian of the Azores or weſtern iſlands, there was no variation of the magnetical needle at all, the aſtronomers and geographers, thought they had found out a fixed ſtation, whereat to commence the firſt meridian, which had before been counted arbitrarily, from whatever place they choſe

choſe to begin it. But this idea ſoon vaniſhed, for a little while afterwards, they diſcovered two other meridians, where there was no variation; the one at a head-land near *the Cape of Good Hope*, to which, on this account they gave the name of *Needle Cape*; and another, at the ſpot where the city of Canton is ſituated. Upon this, they thought they had found out a certain principle, whereon to ground a compleat ſyſtem for calculating or computing variations, by graduating them for the intermediate ſtations, in proportion to their greater or leſs diſtance from the mean ſpace between the two places where there was no variation.

XV. But as nature frequently mocks the ideal propoſitions that are fabricated by the brain of man, this time of rejoicing laſted but a few years, for they diſcovered, that this declination of the magnetic needle, varied more or leſs at the ſame place at different times, and that this chamge of variation was perpetual. This diſcovery, not only demoliſhed the antecedent imagined rules, but nearly took away all hope, of their ever in future, finding out any certain one for their guidance; and this, notwithſtanding many men, eminent for their ſkill in phyſics and mathematics, have long, and ſtill do, labour at accompliſhing it.

XVI. In this inſtance, may be ſeen the fallibility of the moſt plauſible reaſonings unaccompanied by experiments. And we ſhall ſee the ſame, in the other we are about to mention, which relates to the flux and reflux of the ſea.

XVII. As the flux and reflux of the ſea, is evident and apparent to all thoſe who inhabit near the ſea-coaſts, and the courſe and changes of the Moon to all mankind, it was eaſy and natural, to obſerve the correſpondence there was between the movements of the one and the other; that is, that the riſing and falling of the tide, keeps pace with the riſing and ſetting of the moon; and it is probable, that the firſt people who remarked this, fancied that by this ſingle obſervation, they had diſcovered the ſyſtem of theſe admirable movements. But this deluſion was but ſhort-lived, for they ſoon afterwards obſerved, that within the ſpace of the ſame lunar month, there was a great diſproportion between the riſing and falling of the tide, and that it flowed higher, and ebbed lower, at the new and full moon, than it did at the quarters. But when they had advanced this ſtep, it is likely they gave themſelves credit for having diſcovered the whole ſecret, and ſuppoſed, that they knew all that was to be known of the matter; and when they obſerved there was ſo exact a correſpondence, between the motions of

the tide, and the phaſes of the moon, they did not entertain the leaſt doubt, but that they were totally influenced by this planet. But experience alſo undeceived mankind with reſpect to this error, for they found out, that there was another variation of the tides, which did not depend upon the revolutions of the moon, but upon thoſe of the ſun; that is, that ſuppoſing other things to be equal, they riſe higher, at, or near the equinoxes, than they do at the ſolſtices. This gave them to underſtand, that the moon did not reign ſo deſpotic over the tides, as to exclude the ſun from all ſhare in the dominion of them.

XVIII. But after all this was aſcertained, they found, that by truſting the bringing of ſhips into barr'd or tide harbours, to the mere combination of the before-nam'd obſervations, they fell into very dangerous errors; for that there are two other variations, which are very conſiderable, and eſpecially one of them, and which can't be comprehended under any general rule whatſoever; the one is with reſpect to the time of full ſea; and the other, regards the quantum of riſe of the water. The time of full ſea varies at different ports, even under the ſame meridian, and does not happen in all of them at the ſame hour. They vary alſo with reſpect to the magnitude of them, becauſe there is an enormous difference in

the height they flow at ſome ports, to what they do at others, for the water will riſe more than ten fathoms upon ſome coaſts, and not above a few feet on others, and in others again, the riſe is hardly perceptible.

SECT. V.

XIX. If the rules deduced from experimental obſervations are ſo fallible, that it is abſolutely neceſſary in order to avoid all error, to purſue the thread of them ſo ſcrupulouſly, that reaſon ſhould not venture to advance a ſtep, without the light of an experiment appropriated to the buſineſs it is in ſearch of; I ſay, if theſe rules are not to be relied on, what confidence can we place in thoſe maxims, which derive their origin from our arbitrary ideas?

XX. Nature conforms to, and is governed by the idea of its great artificer, not by that of man; and it is ſtrange temerity in man, to preſume he can comprehend the idea of ſuch an artificer. I have ſometimes thought, that if we were told, that there were numbers of thoſe luminous bodies in the heavens which we call ſtars, although we could not ſee them, every one would imagine, ſuch a diſpoſition and collocation of them in the ſphere, as beſt ſuited his own fancy. One would conceive

conceive them diſtributed into various regular ſets of figures, ſuch as triangular, hexangular, circular, &c. which formed ſo many different conſtellations; another, that they were compoſed of a beautiful ſuit, of well ranged and harmonious groups; another, that they were diſpoſed after the manner of flowers, which he had ſeen growing in parterres in ſome garden; another, that they were formed in ſuch a poſition, as reſembled the ſhape of various images, either myſtic or natural. In fact, there would be no body, that would not attribute to them ſome moſt beautiful reſemblance, or imitation, of thoſe things which he had ever ſeen, that ſeemed moſt pleaſing to him, either in art, or nature. Notwithſtanding which, they would all deceive themſelves, and be greatly ſurpriſed, upon the firmament afterwards being diſplayed to their view, to find the ſtars placed and ranged in a poſition, quite different and diſtinct from all they had imagined.

SECT. VI.

XXI. Thus it frequently happens, that men think in one manner, and God operates in another. Men ſuppoſe, and they ſuppoſe right, that the works of God are all executed with order, and in proportion; but although they ſuppoſe well,

they reaſon ill; becauſe they think there is no other order and proportion, than that which comes within the reach of their comprehenſion. The works of God, it is true are wrought with proportion; but with a ſublime proportion, which is much ſuperior to our rules. It is blind temerity in man, to imagine that God in his works, is to conform himſelf to our human groſs ideas of proportions.

XXII. It was a confidence in ſuch proportions, that cauſed Pythagoras to err egregiouſly in his dimenſions of the magnitude, and his calculation of the diſtance of the heavens, which he thought to compute, by the numerical ſeries of the intervals of muſic. And others were not much wiſer than Pythagoras, who by fancying they had found ſome ſpecial perfection in the number four, choſe to ſtamp it on, and regulate all the operations of nature by it. From hence came the four elements, the four firſt qualities, the four cardinal points of the globe, the four quarters of the year, and the four humours of the body.

SECT. VII.

XXIII. If even in thoſe conſequences, which to all human appearance, we deduce immediately from the truths which nature herſelf preſents to our

our ſenſes, we are ſometimes liable to be miſtaken; what dependance can we place in thoſe, that are founded on principles, which without conſulting nature, are eſtabliſhed by our fancy? What conſequence to all appearance could ſeem better inferred, than that of the repugnance of nature to a vacuum, founded on the palpable experiment of the water riſing in the pump? But by the light of innumerable other experiments, the miſtake was diſcovered; and it was found out, that the true cauſe of that, and all ſuch-like phænomena, was the weight of the air.

XXIV. We ſee with our eyes, whether we explain the cauſe of it as proceeding from an intrinſic quality, or from attraction, or from impulſe, that gravity precipitates bodies with a ſwift movement towards the earth. It ſeems moſt natural to ſuppoſe, by reaſoning from the famous axiom, *ſicut ſe habet ſimpliciter ad ſimpliciter, ita magis ad magis*, that to a duplicate gravity, there would correſpond a duplicate acceleration of motion. But the fact differs widely from this proportion.

XXV. It is plain, that air is much more ſubtle and thin than water. Who from hence, would not infer as an unavoidable conſequence, that air muſt penetrate all bodies which water penetrates? Notwith-

Notwithſtanding this, we ſee that water penetrates paper, which air does not penetrate, or it penetrates it in ſo ſmall a degree, or ſo ſlowly, that we look upon it as next to no penetration at all.

XXVI. Who judging by general or common principles, would not conclude, that wet hay was much leſs liable to take fire than dry? But experience teaches us, that by putting together quantities of hay too moiſt, it will take fire of itſelf, which could never have happened, if the hay had been put together ſufficiently dry, or more thoroughly made.

XXVII. What maxim is better eſtabliſhed, or more generally aſſented to among the naturaliſts, than that a vivifying heat of the blood, is indiſpenſably neceſſary for the preſervation of life? But with all this, Father Plumier, a learned prieſt of the order of Minimus, in a voyage in the Pacific ocean, for want of water, found himſelf under a neceſſity of drinking the blood of turtles, and declares, he found it as cold as the common water in Europe. (Mem. de Trevoux, an. 1704. tom. 1. page 175.) Who, agreeable to the laws of ratiocination, can ſay otherwiſe, than that the third quality, reſulting from the mixing three or four fœtid things together, muſt be fœtid alſo? But experience manifeſts to us, that this conſequence is not infallible. Mr. Lemeri bought a certain

certain quantity of the gums galbanum, ſagapenum, and opopanax, and alſo ſome bitumen of Judæa, which he put all together into a retort, and found that there reſulted from the mixtures, a ſtrongly ſcented oil, greatly reſembling muſk; now the bitumen in ſmell, does not in the leaſt reſemble muſk, and the other three drugs are abſolutely fœtid. (Hiſt. de l'Academ. Royal, ann. 1706.)

XXVIII. If a philoſopher, deſtitute of all other information, except that which he had acquired in the ſchools, ſhould be told that two liquids, which to the touch appear cold, ſhould upon being mixed together, not only heat and boil, but alſo emit a flame; he would be in a terrible agitation, and armed with his infallible concluſive principle, *that nothing can communicate a quality which it does not poſſeſs*, would exclaim againſt the propoſition. But let him exclaim as much as he will, it is a certain fact, that from mixing a pure acid, with the eſſential oil of an aromatic plant, there will reſult that commotion.

XXIX. We know that water, is much heavier than air; and we alſo know, that the vapours which ariſe from the earth, are nothing elſe but particles of water, very minutely divided, and conſequently, that they muſt be much heavier than particles

particles of air of the ſame ſize. We know alſo, that a liquid cannot aſcend above another, when they are put together, except when it's particles of equal ſize are lighter than thoſe of the other. From theſe premiſes, it ſhould follow as an infallible conſequence, that theſe vapours cannot riſe ſuperior to the air we breathe. But let this conſequence appear ever ſo infallible, experience convinces us that the fact is otherwiſe.

XXX. Nobody is ignorant, that the aromatic ſpecies, ſuch as the clove, the pimienta, and the cinnamon, are hot or heating, and that the regions neareſt the poles are cold, and thoſe neareſt the equinoctial hot. From theſe premiſes, what naturaliſt would not infer, that the uſe of theſe ſpecies would be leſs pernicious to the inhabitants of the cold regions, than to thoſe of the hot? But experience is ever demonſtrating to us the contrary. For a ſcruple of clove is more offenſive to, and has a greater effect on the firſt, than a drachm has on the laſt.

XXXI. And ſimilar to this, has been the experience of the Hollanders, in ſome of their voyages to the Eaſt Indies. It happened once, that upon paſſing the line, the greateſt part of the people belonging to a ſhip were taken ſick, and that

that more than half of them died, and that thoſe only recovered, to whom in their ſickneſs they gave great quantities of brandy. The medical men found great difficulty in believing, that theſe people could owe the preſervation of their lives to drinking to exceſs of a liquor, which if not taken ſparingly and with moderation, is found to be very pernicious to health. But in the end, they found themſelves obliged to yield to experience; and admit of the liberal uſe of brandy, which afterwards delivered with equal ſucceſs, all the afflicted from their illneſs.

XXXII. It is then abſolutely neceſſary to ſubmit to experience, and if we are not diſpoſed to abandon the real road of truth, to ſeek for nature in herſelf, and not in the deceitful image which our fancy forms of her.

SECT. VIII.

XXXIII. I am not ignorant that there are ſome ſchoolmen, who repreſent the application to experiments, as diſgraceful to, and beneath the dignity of philoſophy. But this is a moſt abſurd error, for at this rate, ſtudying the imaginations of men, would be a more honourable occupation, than ruminating on the works of God. In books of theory, we contemplate human ideas; in natural

tural entities, divine ones. Let reaſon now determine, which is the moſt noble ſtudy.

XXXIV. The prince of philoſophers, Ariſtotle, thought differently in this reſpect to the preſent ſchool ones, for he ſaid, we ſhould not diſdain to examine with our ſenſes, the moſt trifling works of nature, for that we ſhould find in them all, marks of ſublime wiſdom, and juſt and beautiful ingenuity: *Aggredi enim quæque ſine ullo pudore debemus, cum in omnibus naturæ numen, et koneſtum, pulchrumque inſit ingenium.* For ſo it is, that in the moſt humble plant, in the moſt vile inſect, and in the moſt rude rock, we ſee the traces of an omnipotent hand, and the marks of infinite wiſdom.

XXXV. Beſides this, it is a matter of great importance to him who is in ſearch of truth, to chuſe the path that leads directly on to his object, and not to purſue that which will conduct him out of his way, although it ſhould to the eye, appear the moſt deſirable, and the moſt pleaſant to walk through. There is no doubt, that a phyſician in a college, mounted in a profeſſional chair, and reading a lecture, makes a more pompous figure, than when he is attending to, and obſerving the diſſection of a dead body in an hoſpital; but it is by attending to the diſſection, that he attains a know-

ledge of the ſituation and arrangement of the internal parts of the body, which he could never have acquired, by reaſoning or diſputing all his life long in a ſchool. Ideal gold, is poſſeſſed in imagination by lazy people, who while they are ſleeping in their beds, dream it is ſhowered down on them; but the true ore, can only be acquired by force of labour, and digging in the mines with diligence and induſtry. And in no other manner, otherwiſe than in appearance only, can we attain more, than that ſhadow of truth, which we call probability, for theſe are the largeſt advances we can make, by the force of our imaginations exerted in the retirements of the cloſet; and the truth itſelf, is only to be found by ſcrutinizing ſenſible objects, and ſearching in them, for the hidden ſecrets of nature.

SECT. IX.

XXXVI. There is another objection to experimental obſervations, which is not more reaſonable, or better founded than that we have juſt mentioned, which is made by ſome ſuperficial ſchoolmen, who ſay, that theſe ſort of enquiries, do not require reaſon and perſpicuity, but only eye-ſight, diligence, and memory; on which account they condemn them, as things not well calculated

calculated for the exertion of invention, and ingenuity. But how little do theſe people know of the nature of thoſe phyſical experiments, or of the manner in which they are made, which have employed the attention of ſo many learned and ſublime ſpirits, of France, Italy, England, and Germany. In order to diſcover whether any deceitful appearance has crept in, they repeat every experiment many times over; and invent many ingenious methods of examination, to find out, whether the phenomenon proceeded from that cauſe, which at firſt ſight it ſeemed to be derived from, or whether it was the effect of ſome accidental, or occult one. They make exact and nice combinations of their experiments, and invent ingenious methods of comparing them one with another, and then weigh in a moſt delicate balance, both the analogies, and the differences between them, in order to derive with almoſt mathematical certainty, the conſequences to be deduced from them; and they peep into thoſe crevices of nature that are nearly imperceptible, that they may diſcern through them, her inmoſt ſecrets; and I beyond compariſon, find more delicate ingenuity, and more perſpicuity, in many of the experiments of the famous Boyle, than I do in all the abſtractions, and reduplications, of the moſt ſubtle metaphyſicians.

SECT.

SECT. X.

XXXVII. It is certainly and indiſpenſably neceſſary, to make experimental obſervations with the moſt exquiſite attention, in order to avoid our being deceived by them, as our forefathers have been, and as many people are at this day; who, confiding in a ſuperficial and careleſs experiment, have precipitated their concluſions, and without giving themſelves time to reflect, have deduced conſequences, from the firſt information of their ſenſes. From the aſcent of the water in the pump, by conſidering the thing inattentively, was inferred the repugnance of nature to a vacuum. To what labours did Torrizeli, Paſcal, and other ſublime geniuſes ſubmit, what a variety of experiments did they make, and with what ingenuity did they combine and compare them, in order to undeceive the world, and convince mankind, that the true cauſe of this phenomenon was the weight of the air!

XXXVIII. From the flame flying upwards, was inferred the chimerical region of fire, immediately adjoining to the heaven of the moon. In our eſſay on Phyſical Paradoxes, we related

the ingenious experiment with which my Lord Bacon proved, that the flame did not aſcend from any natural propenſity it had to fly upwards, but becauſe it was compelled to it, by the lateral preſſure of the air.

XXXIX. I was once in converſation with ſome ſchool philoſophers, and our diſcourſe happening to turn upon phyſical matters, I took occaſion to propoſe a queſtion to them, which was, whether cold water (and the ſame may be ſaid of every other liquid) was more ſubtil and penetrating than hot, which it ſeemed evidently to be, by the following experiment, that when we poured iced water to drink in ſummer time into a glaſs, we perceived the glaſs wet and moiſt on the outſide, which had the appearance of the water having tranſuded through the pores of the glaſs; and as this did not happen when the water was luke warm, or in a temperate ſtate, it was inferred that ſuch water, was not ſo ſubtil and thin as cold. As the byſtanders ſeemed converts to the force of the before-named experiment, it gave me a good deal of trouble, to undeceive and convince them of their miſtake, although at length I accompliſhed doing it, by making it evident to them by various moſt clear experiments, that the moiſture which adhered to the outſide of the glaſs, did not tranſude

tranſude through its pores, but that it conſiſted of the coagulated vapours, of the circumambient air, which being in a warm ſtate, condenſed and were converted into water, upon their coming in contact with any very cold body, and that they became more condenſed the leſs porous this body was. For this reaſon, the vapours that are raiſed by fire, condenſe as ſoon as they come to the head of the alembick; and for the ſame, if we breathe upon a bright iron bar, or any other metallic body, that has a ſmooth or poliſhed ſurface, and is very cold, the vapour we breathe from our mouths, when it comes in contact with that body, will condenſe, and adhere to it; and it is alſo for the ſame reaſon, that in froſty nights, we ſee the inſide of the glaſs of windows moiſt, when they are dry without, which appearance, I have known ſurpriſe many people, who thought that that humidity was a portion of the external air, which had penetrated through the glaſs; and it is likewiſe for the ſame reaſon, that our breath, and the breath of other animals, is viſible in cold weather, it being then ſufficiently condenſed by the circumambient air, to make it become apparent. But the moſt convincing argument I made uſe of in the diſpute, and which I advanced as a concluſive one, was, that if you covered the exterior ſuperficies of the glaſs with paper, there would not the leaſt

moiſture adhere to it, in the whole courſe of a froſty night, and it is clear that the paper is not impenetrable to moiſture, but can only prevent the external air, from coming immediately in contact with the glaſs.

XL. As it relates to the ſubject of the impenetrability of glaſs by liquids, I cannot forbear in this place taking notice of another very common error, which has originated from drawing concluſions haſtily from experiments, without making proper reflexions on them. It is generally believed, that the zeſt of the rind of a lemon penetrates through glaſs, which opinion is founded on the perſuaſion, that if you preſs out the zeſt on the outſide of a glaſs, the liquor that is within will taſte of it. I concluding this penetration to be impoſſible, after meditating upon the matter, eaſily diſcovered the cauſe of this error; which is as follows, upon preſſing out the zeſt, ſome of the particles are apt to fly and reſt on the edges of the glaſs or very near it, and adhere to that part, which in drinking the lip is applied to; and thus the palate perceives the taſte of the zeſt, which is communicated to it, from the edge of the glaſs. To determine whether this was not the caſe, I ſqueezed ſome of the zeſt in the ordinary way againſt the outſide of the glaſs, and then turning it half round,

round, applied my lips to the oppoſite ſide, and did not perceive the leaſt taſte or flavour of the zeſt of the lemon. And it will happen the ſame to any one, who will give himſelf the trouble to make the ſame experiment.

SECT. XI.

XLI. The evidence of our ſenſes alone, then, is not ſufficient to enable us to derive juſt concluſions from experiments; for caution, reflection, judgement, and reaſon, are always neceſſary; and ſometimes in ſo great a degree, that all the exertion of human talents and ingenuity, is not equal to an adequate examination of the phenomena. Sir Iſaac Newton, an Engliſhman, who was a genius of the firſt rate, and a member of the Royal Society of London, in the beginning of the preſent century, publiſhed various tracts upon optics, in which, he diſplayed a great novelty to the philoſophers and mathematicians; that is, that all colours exiſt and are contained, actually and formally, in the rays of light; which are conſtituted of heterogeneous particles, of unequal refrangibility. He proved this ſingular opinion, with many experiments of exquiſite invention, contrived and conſidered, with no leſs exquiſite delicacy, and in fact, made more than a few converts to his opinion in many

parts, but more eſpecially among the Engliſh mathematicians; and a Mr. Gauger who was one of theſe, enforced the Newtonian doctrine, with a great number of additional experiments; but in a ſhort time, one Sennor Rizetti, wrote againſt this new ſyſtem, and ſtated many experiments in favour of the old opinion, and even pretended, that thoſe which had been quoted by Gauger, militated againſt the Newtonian ſentiment. Gauger replied to this, and paid Rizetti in his own coin; that is, he not only defended the conſequences which he deduced from his own experiments, but turned thoſe derived from the experiments of Rizetti againſt the doctrine of the Italian. It is certain that experience, as applied to many objects, opens a moſt extenſive and fertile field for exerciſing the ingenuity of man, and that nature, even to him who ſeeks to know her in that way, is in various inſtances impenetrable and inacceſſible.

XLII. But we ſhould acknowledge that in general, the difficulties are not ſo invincible, as not to be ſurmounted by reaſon and induſtry, and that the deceptions which ſometimes reſult from experiments, proceed either from the want of proper diligence and attention in making them, or from the want of adequate ingenuity, to judge of, and decide upon them.

XLIII. This

XLIII. This is very frequently the caſe with reſpect to medicinal obſervations; and from hence ſprings that enormons diſagreement, with reſpect to the opinions that are alledged to be founded upon them. One ſays, that he has experienced the efficacy and ſalutary fruits, of ſuch a medicine, in ſuch a diſeaſe; and another inſiſts, that he has adminiſtered the ſame medicine, in the ſame diſeaſe, and under the ſame circumſtances, and found it to be pernicious. One of the two muſt be miſtaken, and I believe it is not very uncommon for both of them to be ſo; for it might poſſibly happen, that the medicine neither did good nor harm, and that the adminiſtration of it, was a mere matter of indifference, and the thing itſelf what we call a chip in porridge. But from what could this difference of ſentiment and aſſertion ariſe? Why from one of them ſeeing that his patient, after adminiſtering the medicine to him grew better, and from the other perceiving, that his after taking it grew worſe; although it might poſſibly happen, that neither the one grew better, nor the other grew worſe in conſequence of taking the medicine, but from a very different cauſe. The diſeaſes of the two patients, from their different conſtitutions, or internal temperaments, (which is for the moſt part, a thing impenetrable to phyſicians) might

be in such a state, that the one was disposed to abate, and the other to increase.

XLIV. And although the patients may be numerous, with respect to whom this experience is alledged; and admitting that they neither all die, nor all recover, every one according to his pre-occupation, will impute to the remedy, either the happiness of those who did well, or the misfortune of those who perished; and unless they shall resolve, to make a computation of the good or bad success of the practice of those who use that medicine, with that of those who never administer it, and compare them carefully together, this doubt will probably never be cleared up.

SECT. XII.

XLV. This inattention, is without doubt what produces, and what keeps up in the world, men's estimation for an infinite number of useless things, on which they bestow the noble epithet of remedies; and this false notion, has filled the medical books and the apothecaries shops, with an infinite deal of trash, the reading of which fatigues the memory; and the taking of which, ruins the health and constitution of the patient. You will find accumulated in them, a great number of remedies for slight diseases, which if left to nature, would cure themselves; and although all practitioners do not approve of the same remedy

medy for the ſame diſorder; does this prove, that the patient of each got better by taking this or that thing? I ſay does this prove it? for neither the imprudent ſick perſon, nor thoſe about him, hardly ever reflect, that there were many others beſides him, who were affected with the ſame diſorder, and who without taking any medicine at all, recovered as well, and as quickly as he did?

XLVI. A benign or favourable ſort of catarrh, as is very frequently the caſe, becomes epidemical in a city; for which, ſome call-in the doctor and take medicines, and others do not; and ſuch is the blindneſs of thoſe who have had advice as it called, that they believe they owe the recovery of their health to the doctor, although they evidently ſee, that all thoſe recovered as well as they, who had no advice, and who took no phyſic.

XLVII. The delicate fine lady, who whenever ſhe feels a ſlight pain in her head, ſends for the doctor, is fully perſuaded, although the pain continues for the ſpace of twenty or thirty days, that the capital pills he preſcribed for her, removed it; but it does not occur to the poor lady, that many of her friends and neighbours, who at times have the ſame ſort of pains in their heads, and who take nothing for them, get well as ſoon, and frequently

quently ſooner, than ſhe with the help of all her pills.

XLVIII. It is very common for thoſe who have pains in their teeth and jaws, (and I ſay the ſame of all thoſe affections which come and go of themſelves,) to fancy, and give the preference to a particular remedy, which they are of opinion relieved them; but it is proper to obſerve here, that every one applauds his own, and reprobates as inſignificant, that which is uſed by other people. From whence does this ariſe? ſome will ſay, that as peoples temperaments are different, it may happen, that in the ſame ſpecies of complaint, the remedy which does good to one man, may have no effect on another; but this is a common and inſufficient evaſion, and ſuch a one, as overturns and levels to the ground, the uſe of all medicinal applications; for if this was the caſe, as all individuals have diſtinct temperaments, no leſs than diſtinct faces, it would be neceſſary to contrive a diſtinct medicine for every ſingle individual, and in all his diſorders, to apply particular remedies, different from thoſe, which in the ſame ſpecies of complaints, ſhould be adminiſtered to every other perſon.

XLIX. The cauſe then of this oppoſition of ſentiments, is moſt probably as follows. The firſt

firſt time a man is attacked with a pain in his teeth or jaws, it is very common for him to make uſe of various applications, for beſides thoſe which are ordered by the doctor, all thoſe who have felt the ſame pain, recommend, ſome one thing, and ſome another; and as the ſenſation is acute, the poor patient anxious to be relieved, proceeds in ſucceſſion, to apply all thoſe remedies, at length, perhaps at the end of eight, ten, or fifteen days, the pain abates; and as there is not one of thoſe days, in which the patient has not made uſe of one or other of theſe receipts, happy is that which he uſed the laſt; for to that he attributes his relief, and reprobates all the others as inſignificant. Another diſeaſed perſon, proceeds to take his medicines in regular order; but the courſe of this regulation, frequently depends upon the caſual concurrence in opinion of the people who are conſulted, or the power that one of them has of prevailing over, and leading the reſt; from whence it frequently happens, that this man of perſuaſive eloquence, adviſes the uſing a medicine in the firſt inſtance, which ſome other practitioner might think it adviſable to adminiſter laſt. The reſult of which is, that in caſe the patient does well, his recovery is imputed to the application of the laſt remedy; and hence it comes to paſs, that one reprobates a medicine which another applauds, and ſo *vice verſa*.

Thus

Thus all the reputation the remedy acquires, be it what it may, depends upon the caſual application of it, juſt at the time nature was diſpoſed to terminate the diſorder by a favourable criſis, and hence it is, that the relief came to be attributed to the medicine. And notwithſtanding that afterwards, upon another occaſion, by uſing the ſame medicine in the firſt attacks of the ſame complaint, they did not experience the ſame effects from it; ſtill the ſame prepoſſeſſion is continued in its favour, that was formed on its ſuppoſed ſucceſs on the firſt trial; and although the patient, did not find himſelf better for ſeveral days after taking it in this laſt inſtance, they perſiſted in imputing his recovery to the favourite receipt, and in thinking that without the aſſiſtance of it, the diſeaſe would have been more tedious, and more ſevere. Nor is it of any avail to remove this prejudice, their ſeeing that others, who neither make uſe of that or any other remedy, do not ſuffer more prolix, or more acute pain than thoſe who apply it; for although they ſee they will not perceive it; and if they do perceive it, they will not attend to or acknowledge it.

SECT. XIII.

L. There is a certain deluſion, that is very fortunate for the apothecaries, and very fatal to the ſick,

ſick, that is derived from a perſuaſion in many of theſe laſt, that their diſeaſes would be eternal, or incurable, without the help of medicine; although they ſee every day, others cured of the ſame diſeaſes, without this aid; and although the diſorder was of ſo ſlight a ſort, that all thoſe who did nothing but leave nature to itſelf, recovered from it, he who called in a phyſician, upon his getting well, thanked the doctor for his cure, when in reality, he perhaps did nothing but delay it. I proteſt that when catarrhs have been epidemical, I have in various inſtances obſerved, that they laſted as long with thoſe who took medicines, as they did with thoſe who took none; and the only difference that I could perceive between them was, that the laſt recovered their natural ſtate of robuſtneſs as ſoon as the catarrh left them; and that thoſe who had taken phyſic, did not recover it till ſeveral days afterwards.

LI. There is another miſtake ſaid to be built upon experience, under the deception of which, many ſhelter themſelves, and pretend, in oppoſition to thoſe who differ from them in opinion, to juſtify the neceſſity of plentiful evacuations. The rigid Helmoniſts, or ſectaries of Van Helmont, reprobate as prejudicial, purging and bleeding, in every caſe whatever; and in oppoſition to this doctrine, is urged the common experience,

perience, deduced from the caſes of an infinite number of patients, who have been purged and blooded, and have all done well; and that there have been ſome weeks in ſickly times, in which one phyſician has ordered a hundred patients to be purged, and as many to be blooded, and that not one of them has died. How then in oppoſition to this experience, ſay the Galeniſts, can any one pretend to inſiſt, that bleeding and purging do harm?

LII. I do not undertake to defend the Helmoniſts, nor do I conſider their opinion, as more probable than the contrary one; but I ſay, that from the experience alledged, nothing can be concluded to their prejudice. We ſhould ſuppoſe, that thoſe who exclaim againſt purging and bleeding, do not think them ſo pernicious, as to be fatal to all thoſe who undergo theſe operations; for even ſuppoſing them to be injurious, they are not capable of deſtroying a man in perfect health, nor one that is viſited by a ſlight diſorder. I believe, that although an intemperate uſe of them kills many, they are chiefly thoſe who are affected with ſome obſtinate diſeaſe; for in theſe caſes, when nature is much weakened by ſtruggling with a powerful diſorder, if you add a freſh enemy for her to encounter in the imagined remedy, you compleat her overthrow, and lay her proſtrate on the earth. But thoſe who

are

are affected with a diſeaſe that is not dangerous, (and there are many of this ſort, which in appearance ſeem violent ones,) generally preſerve a ſufficient degree of ſtrength, to reſiſt both the diſtemper, and ſome unneceſſary bleedings and purgings; and although theſe may weaken the natural faculties, and retard the cure, they very ſeldom are known to deprive the patient of life.

LIII. That the number of mild diſorders, greatly exceeds that of the dangerous ones, is very plain and certain; what then can we find extraordinary, in thoſe who are attacked with the firſt ſort getting well, notwithſtanding they may have been injudiciouſly purged and blooded? out of a hundred patients that a phyſician viſits in a week, ſeldom more than one or two of them labour under dangerous diſorders. It is cuſtomary with many people to ſend for the doctor, upon being attacked with a ſlight inflammation, a catarrh, an ephemeris or fever of a day, a fluxion of the eyes, a repletion of the ſtomach, and ſuch kind of indiſpoſitions; and if he happens to be one of the common or vulgar ſort, he ſeldom fails to purge and bleed. But admitting that the purging and bleeding were never ſo improperly adminiſtered, does it follow from thence, that the patient muſt die? Or why ſhould this be an unavoidable conſequence, if in the

ſame

ſame ſituation, he had been ſtabbed with a poignard that had not penetrated very deep, or that had not wounded a vital part, he would have eſcaped with his life?

LIV. As I obſerved before, I am neither a partizan of the Helmoniſts, nor a favourer of the Galeniſts; but I look upon it as a thing certain, that an intemperate uſe of purging and bleeding, has deſtroyed many men, and eſpecially, if adminiſtered when nature is much weakened; notwithſtanding which, I am perſuaded that they are ſerviceable in many caſes. Whether they are abſolutely neceſſary, and whether patients could not do well, if other remedies were ſubſtituted in their places, is a point I will not take upon me to determine; and eſpecially, when I have freſh in my memory, the declaration of a phyſician, whoſe authority has great weight with me. This is Lucas Tozzi, a famous Italian phyſician, who in his expoſition of the third aphoriſm of the firſt book of Hippocrates, *Habitus Athletarum, &c.* after combating and controverting the uſefulneſs of bleeding, with ſeemingly very efficacious and perſuaſive reaſoning, he aſſerts, and offers to prove, that it is not neceſſary in any one of the diſeaſes, in which the Galeniſts inſiſt it cannot be diſpenſed with; and in anſwer to the experience they alledge of its

utility, he quotes his own ; and ſays, *if they appeal to experience, and inſiſt that it is evident from thence, that many people have been cured of various diſorders by blood-letting* ; *I reply, that in the hoſpital of the Anunciada at Naples, where I have officiated as phyſician many years, I have cured in a ſhort ſpace of time, and without taking from them one drop of blood, hundreds and thouſands of patients, who have been attacked with ſome one or other of the following diſorders, frenſies, pleuriſies, quinſies, inflammations of the liver, ſpitting of blood, eryſipelaſes, and all kinds of fevers.*

LV. What ſhall we ſay to this? Lucas Tozzi was not only a great theoriſt, but alſo a moſt expert, ſucceſsful, and much eſteemed-practitioner, and as ſuch, his advice was ſolicited with anxiety by people of the firſt rank. If he without bleeding cured all thoſe diſorders, which in the common opinion ſtand moſt in need of that evacuation, and not only cured them, but did it in a ſhort time, what diſeaſes muſt they be which cannot be cured without blood-letting?

LVI. And it is very remarkable, that in the ſame manner the Galeniſts endeavour to deduce from experience the neceſſity of blood-letting in many diſeaſes, they endeavour alſo to eſtabliſh the preference, that ſhould be given to draw-

ing blood in particular diſorders, from particular veins, ſuch as the hepatic, and cephalic. Anatomy however, makes it as clear as the ſun at noon-day, that this preference is not grounded on any ſolid foundation, and that the cephalic vein bears no more relation to, nor is any more connected with the head, than the hepatic, nor the hepatic with the liver, than the cephalic; and that all the veins of the ſame arm, communicate indifferently with all parts of the body, as the laws of circulation demonſtrate; and as that obſervation which was pretended to be derived from experience, was founded in miſtake, it is not improbable, that that which is generally alledged in favour of bleeding, may be ſo likewiſe.

LVII. What appears to me is, that the rule ſo much cried up by the Galeniſts, and which eſtabliſhes the neceſſity of bleeding in pleuriſies, is liable to ſo many exceptions, that we ought not to regard it as a general one; and we have obſerved in another part of our works, that in ſome epidemical pleuriſies, it has been found to be evidently injurious. It is but a little while ago, that a learned French phyſician, whoſe works are mentioned in the Memoirs of Trevoux, wrote ſtrongly againſt bleeding in winter pleuriſies and peripneumonies; and his reaſoning

ing had great weight with ſome eminent phyſicians of Paris. I can certify, that in the laſt winter 1731, when many people were attacked with pleuriſies in this country, it was generally remarked, and we received informations to the ſame effect from all quarters, that thoſe who were blooded died, and that thoſe who were not did well.

LVIII. I would have it underſtood, that I wiſh all I have ſaid, with reſpect to the utility or inutility of purging and bleeding in general, ſhould be conſidered as the ſentiments of a man, who takes no ſide in the diſpute, but who propoſes what he advances problematically, and with a view of convincing the world, that in order to avoid being miſled, they ſhould examine with great attention and exactneſs, any obſervation that is alledged to be founded on experience, for this is the principal object I had in view, in writing this diſcourſe.

LIX. It would argue weakneſs and want of judgment, for any one to eſteem a thing as a remedy for a particular diſeaſe, without reflecting and making a remark, the propriety of which muſt ſtare every man in the face, and that is, comparing the ſucceſs of the practice of thoſe who uſe that medicine, with that of thoſe

who do not make uſe of it. There have been phyſicians, who have declared themſelves enemies to the adminiſtration of the bark; but notwithſtanding this, there is no body at this day, who diſputes its febrifuge efficacy in intermittent caſes; for experience ſhews, that it will ſtop the fit, although it may return again afterwards, and although in the opinion of ſome people, the medicine may leave ſome bad impreſſion on the body. If purging and bleeding would have the ſame effect, in ſome ſort of fevers, we ſhould all agree in attributing to them a febrifuge virtue; notwithſtanding that ſome practitioners, might give the preference to other remedies, as more ſafe, and better adapted. But this is ſo far from being the caſe with reſpect to theſe evacuations, that their efficacy of removing fevers, is at this day ſtrongly conteſted, for experience has not yet manifeſted, that they are remedies for theſe diſorders, in any degree or manner, that is not exceedingly doubtful or diſputable.

SECT. XIV.

LX. As far as the nature of the caſe will permit us (for all things are not capable of being mathematically or deciſively demonſtrated), we ſhould endeavour to diſcover the truth, by imitating

tating the diligence and attention which many Engliſh phyſicians exerciſed, in examining into the eligibility of the precautionary remedy called inoculation, practiſed by the Turks, to elude the fatal effects of the ſmall-pox. This is a ſubject, that has been much talked on in other kingdoms for ſome years; although in Spain we have hardly heard it mentioned. The event of communicating the infection in this way, moſt generally is, that the perſon inoculated has the diſtemper very lightly, and is hardly ever obliged through the whole courſe of the diſeaſe, to keep his bed.

LXI. The account of this precautionary method, was brought to England by one Maitland, who was ſurgeon to Mr. Wortley Mountague, his Britannic majeſty's ambaſſador at the Porte, and was from thence communicated to the other nations of Europe. Maitland had obſerved, that this practice was almoſt univerſal in all the cities of the Levant, and that it was attended with wonderful ſucceſs. He communicated theſe remarks to Mr. and Mrs. Mountague, and they had fortitude enough, upon the faith of what he had told them, to make the experiment upon a ſon they had with them of ſix years old, which being attended with ſucceſs, they repeated it upon another of their children when they re-

turned to England. Many were animated with theſe examples and theſe accounts; and the practice of inoculation, began to be much approved, and much adopted in England, notwithſtanding it was greatly oppoſed, and objected to by ſome people there, and by many in other countries; and eſpecially by the phyſicians of Paris, who exclaimed ſtrongly againſt it.

LXII. But as this conteſt was ſuch a one, as ought not to be determined by ſpeculative reaſoning, an appeal was made to experience, which appeal, was proſecuted in ſuch a manner by thoſe who were advocates for the practice, as ſeemed to exclude all doubt and perplexity. Phyſicians who reſided in different parts of the kingdom, were requeſted to give accounts of the ſucceſs of their practice by this method, and to tranſmit them to London, which when received, were printed and publiſhed. By theſe accounts, two facts were eſtabliſhed; the firſt was, that inoculation freed the patient from the danger of a ſecond infection; and the ſecond was, that thoſe to whom the ſmall-pox was communicated in this way, very rarely died; and although it is true that ſome few of them miſcarried, they were moſtly ſuch, as were afflicted with ſome other diſorder at the time of their inoculation, of which they would have died, if they had not had

had the ſmall-pox; but theſe altogether, did not amount to but very little more than a tenth part of thoſe, who periſhed by catching it in the natural way; for by the beſt calculation they could make, one out of eight died of the laſt, and not above one in eighty of the firſt.

LXIII. This is the account I have read of this matter in the Memoirs of Trevoux; to which ſome may object, that it is poſſible the relations of the caſes, were not publiſhed ſo faithfully as they were received. To this I anſwer, that it is probable great pains were taken in making the enquiries, and great fidelity obſerved in publiſhing the accounts, as the Memoirs of Trevoux tell us, that upon the ſtrength of their authority, ſome of the royal family of England were inoculated.

LXIV. And let it not be inſiſted in oppoſition to this, that if the fact had been ſo well eſtabliſhed, it could have admitted of no contradiction. They know little of the human paſſions, who think this remark a ſolid one. Thoſe who contradict, either through blind prepoſſeſſion, or from motives of emulation, intereſt, or envy, ſeldom ſubmit, or will own themſelves convinced by proofs that are ſelf-evident; nor is there any ſpecies of evidence, that can bar every door,

at which a falſe ſubterfuge may ſteal in, nor againſt the intruſion of a thouſand ſophiſtical objections, introduced by thoſe, who are under the dominion of the beforenamed paſſions. I ſpeak feelingly of this matter, having had woeful experience of the truth of what I aſſert, ſince I firſt began to write for the public.

LXV. In reality, ſome of the objections that were made to inoculation, were the moſt ridiculous in the world. Some rigid Preſbyterians, made the cauſe of religion intereſted in the queſtion, and aſſerted, that that practice, was an affront to the ſovereignty, and an oppoſition to the decrees of God; and one of them declared in his preaching, that it was a diabolical invention, for the devil by inoculation had communicated the ſmall-pox to Job, which was the diſtemper that ſo ſorely afflicted that holy Patriarch. Into what abſurdities, does a violent ardour hurry a man in a controverſy! Of all ſenſible human beings, there are none ſo nearly allied to mad men, as paſſionate diſputants.

LXVI. Towards the concluſion of this virulent conteſt, a very curious circumſtance came to light, which was, that this precautionary method which had made ſo much noiſe, and which had generally been ſuppoſed to have been brought

brought from Turkey, had for ages before, been in uſe in the iſland of Great Britain itſelf; for that it had been practiſed from time immemorial, in the ſouthern parts of the principality of Wales, where they communicated the infection in two ways, either by rubbing ſome of the variolous matter hard on the ſkin of the perſon to whom the diſtemper was to be given, or elſe by dipping a needle into that matter, and pricking his ſkin with it; and as they gave the perſon from whom the matter was taken a ſmall ſum of money, this was called buying the ſmall pox; and they produce very authentic teſtimonies, that ſcarce any one of thoſe who came by the diſtemper in this manner died, and that there was no inſtance of a perſon who had acquired the diſeaſe in this way, ever having had it a ſecond time.

SECT. XV.

LXVII. We ſhall conclude this diſcourſe, by pointing out three capital errors, which are derived from want of proper attention in making experiments. The firſt is, that of taking for the effect, what in reality is the cauſe, and taking for the cauſe, what is nothing more than the effect. The ſecond conſiſts in taking for the cauſe, ſomething that comes in by accident, and which

which has no influence whatever. The third conſiſts, in between two effects proceeding from one and the ſame cauſe, taking one of them for the cauſe of the other. I ſhall give examples of theſe three errors, in obſervations appertaining to medicine, which are ſaid to be derived from experience, becauſe miſtakes in this branch, are generally attended with worſe conſequences, than thoſe in other ordinary phyſical matters.

LXVIII. It happens, that a man feels an ardent and extraordinary thirſt upon himſelf, without being able to aſſign any apparent cauſe of it; he drinks water to great exceſs, and in a few hours is ſeized with a fever, or an acrid fluxion. It is common in ſuch caſes, to attribute the indiſpoſition to the exceſſive drinking of water, and to apprehend, that was the cauſe of the diſeaſe; but this was ſo far from being the caſe, that the indiſpoſition was rather the cauſe of his drinking to that exceſs. But I would have it obſerved, that I ſpeak of an inſtance, in which the thirſt was not brought on by any manifeſt or apparent cauſe, ſuch as the having uſed any violent exerciſe, or having been expoſed to ſome great heat, either of the ſun or fire, or having been a long time without drinking, or having eaten ſomething very ſalt. I ſay that agreeable to this ſtate of the caſe, it is very clear, that the thirſt

thirſt muſt have ariſen from ſome internal cauſe; but the queſtion is, from what cauſe? Why it could be from no other, than a morbific diſpoſition, that had begun to prevail within his body; or let us expreſs it in another manner, and ſay, that it proceeded from an acrid or ſalt humour, which had juſt begun to get in motion, and by vellicating the fibres that produce the ſenſation of thirſt, had by that means excited it. Every preternatural and extraordinary effect, demands a preternatural and extraordinary cauſe to occaſion it; and if we ſuppoſe that the thirſt was ſuch an effect, and we cannot aſſign any external cauſe to which we can attribute it; we muſt conclude that it proceeded from ſome preternatural internal cauſe; which in all probability, muſt be the morbific diſpoſition.

LXIX The want of this reflection, occaſions great errors to be committed in phyſic, for by running counter to the courſe of nature, you muſt unavoidably miſtake the road that leads to the cure. The conſequence of miſtaking the effect for the cauſe, is adminiſtering as a medicine, what in reality is poiſon; for it is clear, that if the phyſician apprehends the humidity and coldneſs of the water to be the cauſe of the diſtemper, when in truth it was produced by the acrid, ſalt, peccant, or inflammatory humour, I ſay if this

this ſhould happen to be the caſe, and he calculates his preſcriprions to correct the humidity and coldneſs, he by ſo doing, will inflame and increaſe the original diſorder.

LXX. This ſpecies of error, is not confined to the caſe we have inſtanced, but is capable of being extended to a vaſt expanſe. I am much inclined to think, that all the extraordinary and vehement emotions, both of the iraſcible, and libidinous kind, which precede diſtempers a ſmall diſtance of time before they make their nppearance, and for which you can affign no ſpecial external cauſe, are the effects of thoſe diſtempers, in their original ſtages; I mean, that in the firſt agitations of ſuch caſes as we are ſpeaking of, a perſon is apt to fall into violent paſſions upon very ſlight provocations, ſuch as he knows by his own experience, were never uſed to agitate or have that effect on him, and either immediately, or within a few hours afterwards, he is ſeized with a fever. People are apt to ſuppoſe, that the paſſion was the cauſe of the diſeaſe ; but I ſay, that the diſeaſe occaſioned the anger ; for if this man, agreeable to his natural diſpoſition, was never ſubject to ſuch violent ſtarts of paſſion, upon ſuch, or even greater provocations, it neceſſarily follows, that that which he experienced upon this occaſion, muſt have been the effect of ſome

preternatural internal cauſe, which lay concealed within him, moſt probably the firſt fermentative movements of the peccant humour, which ſoon afterwards produced a fever. In reality, it is eaſy for any one to perceive, and I have remarked it many times both with reſpect to myſelf and others, that the iraſcible paſſion, is much more apt to be inflamed upon ſlight occaſions, in thoſe firſt ſtages, or almoſt inſenſible beginnings of ſuch indiſpoſitions as tend to be ſomewhat ſerious, than at other times.

LXXI. I do not however deny, that the ardour of paſſion may excite a fever; for this without doubt, may have a great ſhare in producing ſuch an effect, and we may reaſonably ſuppoſe that it has, and eſpecially in ſuch people as are of a choleric diſpoſition; but when this is not the caſe, we ſhould rather ſuppoſe, that the paſſion tended to augment the indiſpoſition which followed the ſudden fit of anger, and which would have made its appearance without the intervention of that anger, although it might have heen attended with milder ſymptoms. And the ſame we ſay of anger, is applicable to ſadneſs and fear alſo, for they conformable to the language of the philoſophers, are paſſions appertaining to the iraſcible.

LXXII. We

LXXII. We may reaſon in the ſame general way, upon the effects of the amorous paſſion. All vehement deſires for ordinary objects, which frequently preſent themſelves to a man's view, and which are totally unuſual to him, and for which we cannot aſſign any ſpecial external circumſtance that ſhould excite thoſe deſires, we ſhould conclude, that they proceed from ſome preternatural internal diſpoſition. The indulgences or gratifications of theſe extraordinary deſires, are always attended with actions of exceſs, to which are generally attributed the indiſpoſition that follows them; but in truth, the indiſpoſition which laid concealed, irritated the appetite, and was the cauſe of the exceſs, and not the exceſs of the indiſpoſition.

LXXIII. The following miſtake alſo, is very frequently fallen into. A perſon who has always been indifferent about this or that particular food, we will ſay lettuces for example, all of a ſudden takes a great fancy for them, and will eat two or three large ones. If he is afterwards attacked with a pain of the head, and defluxion upon the breaſt, or a diarrhœa, the fault is ſure to be laid upon the lettuces, which are accuſed as the cauſe of all the miſchief; but in reality, the miſchief had before crept into the conſtitution, and had induced the extraordinary deſire to eat the lettuces.

LXXIV. I

LXXIV. I would not however, be underſtood to inſinuate, that eating of any thing to exceſs, does not frequently occaſion or bring on various diſeaſes; for I only mean that my poſition ſhould be underſtood to allude to a deſire that is vehement, and unuſual to the perſon, and for which, you can aſſign no viſible external cauſe that ſhould excite it; for under ſuch circumſtances, there is a neceſſity for concluding it was owing to ſome internal cauſe, that was ſufficiently powerful to merit the name of a morbific diſpoſition; which is an appellation it could not have deſerved, if the appetite although extraordinary, had not been exceſſive.

LXXV. I am confirmed in the truth of the remark I have juſt made, by the reflexion, that a diverſity of appetites, muſt undoubtedly proceed from a diverſity or alteration of temperaments; and it follows of courſe, that every alteration in the temperament, muſt be attended with an alteration of the appetite. It is eaſy to diſcern, that no ſick perſon, preſerves his appetite in the ſame even ſtate, in which it continues when he is in health; and this not only with reſpect to the quantity he eats and drinks; but with reſpect to the quality of his nouriſhment alſo; nor is this confined to the objects of his palate only, but extends to thoſe of all his other feelings

feelings and inclinations, both internal and external.

SECT. XVI.

LXXVI. The ſecond capital error committed in making experimental obſervations, and which is more common than the firſt, is that of miſtaking for the cauſe, ſomething that intervenes by accident, and is neither cauſe nor effect. There is ſcarce any ſick perſon, who does not fancy he knows what has been the cauſe of his diſorder, which he generally imputes to ſomething particular that he has done, or ſome alteration he has made in his way of living a little before he was ſeized with his diſtemper; although the thing to which he imputes it, bears no alluſion to, nor any proportion with the diſorder that afflicts him. The having eaten an olive more than it was uſual for him to eat, or having faſted a quarter of an hour longer than his uſual time, or having drunk two ſpoonfulls more than common, or abated twenty yards of his ordinary walking, together with ſome other particulars, that are equally trifling and inſignificant with thoſe we have mentioned; but notwithſtanding the futility of theſe obſervations, he is apt to impute to ſuch cauſes the diſorder he labours under, without reflecting, that this machine of ours, from the weakneſs

neſs of its own texture, is ſufficiently expoſed to its breaks, ebbings and flowings. The humours of the body, even when the influence of all external cauſes, and every thing that depends on our own free will, are regulated with perfect uniformity, are nevertheleſs expoſed to various alterations. The heterogeneous nature of them as they reſpect one another, and alſo conſidered with reſpect to every particle of each of them ſeparately, muſt neceſſarily conduce to their being in different ſtates. If thoſe ſuperſtitious ſpirits, who are ſuch idolaters of their health, that with reſpect to their own regimen they would weigh even atoms, would well conſider this, they would free themſelves from the continual anxiety in which they live, and which is more pernicious to them, than thoſe very indiſpoſitions they are ſo terrified at, and which they are at ſo much pains to eſcape.

LXXVII. But the moſt common accuſation of all, is that which charges the weather as the cauſe of our diſorders. He who commits no exceſſes, and cannot aſſign any other cauſe for his being out of order, lays the blame upon the weather, and even he who does commit them, to avoid criminating himſelf, lays the blame on the weather alſo; which be it hot, moiſt, dry, variable, or ſettled, people are never at a loſs to find out ſome pretence whereon to ground the accu-

ſation. If in July, as is cuſtomary at that ſeaſon, we find it very hot, we ſay the heat is the cauſe of our diſorders; but if the weather at that time happens to be more benign and temperate than uſual, they ſtill lay the blame upon it, alledging that ſuch a temperature of air is not natural to the ſeaſon. The ſame ſort of charge is brought againſt the cold in winter, whether it is intenſe or moderate. If at that time of the year, the weather is variable, there is ſcarce any one who does not find fault with it; neither is it exempted from blame if it is ſettled, for then they ſay that change of weather is indiſpenſably neceſſary to our conſtitutions; and that any kind of weather which laſts a long while is hoſtile to them; that long cold occaſions conſtipations, long heat diſſolves and weakens us, long wet ſuffocates us, and that long drought burns us up and conſumes us.

LXXVIII. I have often remarked, that all our misfortunes are imputed to two common enemies: our ſpiritual ones to the Devil, and our bodily ones to the weather. There is ſcarce any one, who, in order to extenuate his own guilt, does not ſay, he was tempted by the Devil to commit the crime he has been guilty of. He is as irrational who thinks, that if there was no Devil to tempt us, we ſhould never ſin, as he is who

thinks, that if the weather was regulated in a moſt perfect form and order, we ſhould never be ſick. Within ourſelves, and in the very eſſence of our being, lies the origin of all our ills, both ſpiritual and temporal; and our nature is ſwayed by its own weight, towards both the one and the other evil; although we can never be led into the firſt without our own conſent; but the other ſpecies, may frequently be brought on us againſt our will.

SECT. XVII.

LXXIX. The third error committed in making experimental obſervations, although it is not ſo common as the two firſt, is pretty often incurred. If he for example, who on account of his having uſed ſome violent exerciſe, drinks ſmall liquors to exceſs, and afterwards finds himſelf feveriſh, imputes his being ſo, as is very frequently the caſe, to his having drank ſuch liquids to exceſs; the generality of men, ſeldom reflecting upon any exceſſes, but thoſe of the appetite; but with all this, violent exerciſe is much more likely to inflame the blood, and diſturb the humours, than drinking to exceſs of ſmall liquids, and therefore it would be much more rational, to impute the fever to the vi-

olence of the exercise, than to drinking small liquids to excess.

LXXX. I believe that from the blunder of mistaking two effects of the same cause, the one for the cause, and the other for the effect, arose the opinion, which is so common among medical people; that all fluxions wherever they fall, the gout not excepted, descend from the head; and it being very common, for those who are affected with acrid fluxions that fall on any part of the body, to feel pains and heaviness in their heads; I suppose that from thence sprung the notion, that all fluxions originate in, and are derived from the brain; but there are not a few modern physicians who are of a contrary sentiment, and in my opinion they are right.

LXXXI. In the first place, I do not know why the vicious humours, from whence the matter of fluxions are derived, should make the grand circuit through the head, before they fall on any particular part that is at a distance from it; as they could, by being mixed with the blood in their circulation through the veins and arteries, be derived immediately from them, on any member or part of the body.

LXXXII. Se-

LXXXII. Secondly, if ſuch a vaſt quantity of humour, as is diſcharged by ſome fluxions, was to be lodged in the brain, it ſeems to me that it muſt render a man quite ſtupid, and that organ incapable of exerciſing any of its functions.

LXXXIII. Thirdly, it is not eaſy to point out the channel, through which the humour paſſes from the interior part of the head. Many pretend to ſay it paſſes through the Ethmoides, or Os Criboſo; but Sneider denies this, for that you cannot find any cavities or perforations in this bone, through which thoſe humours could flow, and eſpecially if they are pituitous and clammy, as the antients ſuppoſed them to be; and to this we may add, that this bone is entirely covered or lined by the meninges, and the interior tunic of the noſe. It is true, as Doctor Matinez obſerves in his treatiſe on anatomy, that its upper part is very porous, and that from thence it came to be called the os criboſo, or ſpungy bone; but as theſe ſpungy pores do not pervade the whole bone, and are not pierced through it, ſetting aſide the obſtacle it would meet with from the membranes or tunics that ſurround it, the humour could not paſs that way. If it is inſiſted, that it flows through the nervous ducts, I aſk how it comes not to be attended with obſtructions, that muſt produce dangerous conſequences?

LXXXIV. Fourthly and laſtly, that through whatever channels you ſuppoſe the humour to paſs; how does it happen, that neither in them, nor the parts immediately connected with them, it does not excite any ſenſations, but that ſore feelings, are only perceived at the part where it vents itſelf? Is it not totally incredible, that a very acrid humour derived from the head, and which flows to the ſtomach, to the breaſt, to the inteſtines, and even to the extremities of the feet, ſhould produce no ſenſations in the intermediate parts between the head, and the place on which it falls? This difficulty, which occurred to me many years ago, I have often mentioned to medical people, but never could get any ſolution of it that was ſatisfactory to me.

LXXXV. If by way of objection to what I have here advanced, the argument we have mentioned before is urged, that defluxions on any part of the body are generally attended with a pain in the head; I anſwer, that it cannot be inferred from thence, that the humour deſcends from the head. In the firſt place, for I have obſerved it many times with regard to myſelf, theſe fluxions are often not attended with any pain in the head at all; and to make the inference juſt, they ſhould always be attended with one. Secondly, although a pain in the head

ſhould

ſhould conſtantly accompany a defluxion, the objection made would eaſily be removed, by ſaying, that this appearance is fallacious, for that both the pain and the defluxion, are effects of the ſame cauſe, and not one the cauſe of the other. In fact, reaſon tells us this is the caſe; for the acrid humour, which when ſeparated from the maſs of blood, falls on, and diſcharges itſelf at this or that place, while it continues in the circulation, has nothing to hinder it from venting ſome portion of its poiſon on the head, and exciting pain there; and eſpecially, as it is generally ſuppoſed, the nidus of the humour which flows in defluxions, is in the glands, and the brain holds the firſt place in that claſs; for which reaſon, Hippocrates and Wharton, call it the great and principal gland.

LXXXVI. If it is replied to this, that in every defluxion which is ſomewhat violent, although we do not feel what may be properly called pain in the head, we at leaſt perceive a heavineſs in it; which renders that organ unfit for its operation. I confeſs that this is ſo, but to the confeſſion, ſhall beg leave to add two remarks. The firſt is, that this is not a ſymptom peculiar to fluxions, for that the ſame thing happens in many other diſorders; but the generality of phyſicians do not conclude from hence, that thoſe diſeaſes originate in the head. Se-

condly, neither is this heavineſs or inaptitude, peculiar to the head, for upon obſervation, you will find that fluxions and many other diſorders alſo, have the ſame effect upon the other members of the body. Whoever is affected with a violent defluxion, either on the throat, the breaſt, the ſtomach, or any other part, will find that his whole body, and every member of it, is more heavy and liſtleſs, than when he is in good health; and that all his limbs are leſs fit for action; and that they all with a very little exerciſe of them, become ſoon tired. Thus we have no reaſon to attribute a heavineſs as peculiar to the head, in the attacks of fluxions, when we ſee it is common in thoſe attacks, to all the other members of the body; and it has been for want of making this reflexion, that the world have conjectured all defluxions were derived from the head.

A DIS-

A

DISPLAY of the INTELLECTUAL FACULTIES OF THE VARIOUS PEOPLE,

With REMARKS on the TALENTS of the DIFFERENT ONES.

SECT. I.

I. THERE is no doubt, but the different temperament of air in countries, induces a ſenſible diverſity in men, brutes, and plants. In plants, the difference is ſo great, that the ſame which in one country is innocent and ſalutary, in another is noxious and poiſonous, which, as we are aſſured, is the caſe with the Perſian apple. The diverſity between brutes, is not leſs than that between plants, both with reſpect to their ſize, fierceneſs, ſtrength, and other qualities; but beſides what is obvious and clear to the obſervation of all men in this matter; we are aſſured there are countries, where many ſorts of animals, degenerate totally from the characteriſtic

racteriſtic property of their ſpecies. If we are to believe Lucianus, Macedonia produces ſerpents, ſo ſocial to the human race, that they will play with children, and gently apply their mouths to the nipples of women's breaſts to ſuck their milk; and as Louis de Marmol informs us, in Gruregra a mountainous country in the kingdom of Fez, the lions which are very numerous, are ſo tame and ſo timid, that the women with ſticks in their hands, beat and drive them about like ſo many domeſtic dogs.

II. If the difference in our own ſpecies, which is produced by a diverſity of climate, is not ſo great, it is ſufficiently evident and apparent. It is manifeſt, that there are countries, where the inhabitants are remarkable for being of larger ſtature than they are in others, or for being more active, more ſtrong, more healthy, or more beautiful; and that this difference ſubſiſts with reſpect to all other things, that depend upon the two faculties that are common to both men and brutes, that is, the ſenſitive and the vegetative. Even in nations which border upon each other, this difference is ſometimes obſervable.

III. Diſtinct diſpoſitions of body, are attended with diſtinct qualities of mind; and from diſtinct temperaments, reſult diſtinct inclinations; and from

from diſtinct inclinations, diſtinct cuſtoms and manners. The firſt of theſe conſequences is a neceſſary one; but the ſecond is not ſo certain, becauſe a man's free will may reſtrain the impetus of his inclination; but as is moſt commonly the caſe, men let their free will be led by the emotions, which are produced by the interior diſpoſition of the machine; ſo that we may ſafely pronounce, that men in one country are more addicted to paſſion and anger, in another to gluttony, in another to be laſcivious, and in another to be lazy or ſlothful.

IV. The inequality between men of different regions in the rational part, is generally ſuppoſed not to be leſs, but rather greater, than it is in the ſenſitive and vegetative; and it is not only in the converſation of the vulgar that we ſee this opinion upheld, but we ſee it ſupported in the writings of the learned; where we find one nation deſcribed as rude and ſavage, another as ſtupid, and another as barbarous; ſo that when according to this deſcription of them, we come to compare one of theſe nations, with one of thoſe who are eſteemed cultivated and poliſhed, we conceive that there is nearly as great a difference between the inhabitants of the one and the other, as there is between men and wild beaſts.

V.

V. I differ ſo widely from the common opinion in this particulat, that with reſpect to the eſſential part of the uſe of the underſtanding, in the inhabitants of one nation and another, the difference is imperceptible. This ſentiment cannot be better juſtified, than by ſhewing, that thoſe nations which are commonly reputed rude and barbarous, are not inferior in ingenuity to the moſt cultivated ones, and perhaps in ſome inſtances excel them.

SECT. II.

VI. We will begin our compariſons with the nations of Europe. The Germans, who have been ſo ſtigmatized for heavy dull people, that Father Domingo Bohurſius a French Jeſuit, in his Converſations of Ariſtius and Eugenius, made no ſcruple of pronouncing, that he doubted whether it was poſſible to find a man of bright talents in the whole country: however, in anſwer to this charge, it may be alledged, that Germany has produced ſo many excellent authors in all kinds of literature, that it is hardly poſſible to number them. I doubt whether the before-named Frenchman, by rummaging for them through the ſeries of all paſt ages, can point out

out two of his countrymen, who were equally eminent with Rabanus Maurus, and Albertus the Great. The epithets which Cardinal Baronius beſtows upon Rabanus Maurus, are, that he was the reſplendent ſtar of his age, and the ſupreme Theologian of his time; and Sextus Senenſe, recognizes him as a man moſt perfectly accompliſhed in all kinds of letters; and the Abbot Trithemius, after celebrating him as a moſt excellent Theologian, Philoſopher, Orator, and Poet, adds, that Italy never produced a man equal to this; and Trithemius was not ignorant, that Saint Thomas Aquinas was a native of Italy. Whom can France boaſt that exceeded Trithemius himſelf, who was ſo greatly venerated by Cornelius Agrippa; or who excelled the Abbot Rupertus, or Father Athanaſius Kircher, who according to Caramuel was divinely learned; or Father Gaſpar Schotti, and many others whom I ſhall omit? Neither ſhould we forbear to mention that ray or flaſh of criticiſm, Gaſpar Sciopius, who was the terror of all the learned men of his time, who at the age of ſixteen begun to write books, which were the admiration of men of years and experience. I have in this literary map of Germany, only pointed out the mountains of greateſt eminence, as I had not room to inſert the leſſer ones in it.

VII. The

VII. The Hollanders, who in the days of antiquity were reputed for ſuch ſtupid people, that it was common among the Romans, when they had a mind to deſcribe a heavy dull man, or one that was ſlow of apprehenſion, to make uſe of the following proverbial expreſſion, *auris Batava*; that he had the ears of a Hollander; however, the Dutch ſince then, have clearly proved, that imputation was a falſe one, for the opinion of their being people of ability, is at this day very fully eſtabliſhed. Their civil government, and their induſtry in commerce, are the admiration of all the world; and there is ſcarce an art, that is not cultivated and brought to great perfection among them. The two Williams of Naſſau, Eraſmus, and Hugo Grotius, are ſtriking examples of their talents for policy and literature. Thus we ſee in this as well as other nations, the want of application has been conſtrued into rudeneſs; but as ſoon as the neglect of ſtudy was remedied, the injuſtice of the imputation became manifeſt.

VIII. The abilities of the Muſcovites alſo, have till of late days, been held in as much contempt as thoſe of the antient Hollanders were; for it was but in the laſt century, that Urban Chevreau a celebrated wit of France, ſaid that a Muſcovite was *the man of Plato*; by which expreſſion,

preſſion, the French Author alluded to the poor definition that philoſopher gave of a man, when he deſcribed him to be an animal without feathers, who walked upon two legs, *animal bipes implume*; this gave occaſion to the joke of Diogenes, who having plucked the feathers off a cock, threw him into the ſchool of Plato among his diſcipies, calling out with a loud voice, *ſee the Man of Plato.* Chevreau attempted to ſay, that the Muſcovites were nothing like men but in their figure. But after the Czar Peter Alexiowitz had introduced arts and ſciences among them, it ſoon became evident, that the Muſcovites were as much men in all reſpects, as any of the other people in Europe. But if this never had been done, how could any one ſuppoſe that a people who were ſtupid and ſenſeleſs, ſhould have been able to form a moſt extenſive empire; and to preſerve it for ſo long a ſpace of time as the Ruſſians have preſerved theirs? It required great ability to conquer ſuch an empire; and to preſerve it in the face of two ſuch powerful enemies as the Turks and the Perſians, much more. I am not ignorant, that Muſcovy is a part of antient Scythia, whoſe moroders were reputed, and with reaſon, the moſt ſavage and barbarous of men; this barbariſm, did not proceed from their want of natural talents, but from the want of thoſe talents being cultivated; of which truth, the famous

famous philoſopher Anacharſis is a ſtriking inſtance, who was the only man of that nation, that went to ſtudy in Greece. If numbers of other Scythians had done the ſame, Scythia might poſſibly have exhibited many Anacharſiſes.

SECT. III.

IX. If we attempt going out of Europe, every thing beyond thoſe limits ſeems barbarous to us. When the imagination of the vulgar contemplates Aſia, it repreſents to them, the Turks, the Perſians, the Indians, the Chineſe and the Japoneſe, as little better than ſo many congregations of ſatyrs, or demi-brutes. But notwithſtanding this, there are none of theſe nations, who do not make as great advances in all the things they apply themſelves to, as we do in whatever we ſtudy.

X. Their abhorrence for, nor their ignorance of the ſciences in Turkey, is not ſo great as is generally imagined; for they have profeſſors both in Conſtantinople and Grand Cairo, who teach aſtronomy, geometry, arithmetic, poetry, and the Arabic and Perſian languages. But they have not ſo great an eſteem for thoſe faculties, as they have for politics; in their knowledge of which, there is ſcarce any nation who is

is equal to them, nor are there any ſubtilties appertaining to political arts, which they are ignorant of. The great Engliſh traveller, Mr. Chardin, in the relation of his voyage to India by land, tells us, that when he paſſed through Conſtantinople, he had much converſation with Senor Quirini the Venetian ambaſſador at the Porte; who aſſured him, that he had never treated with a man of equal penetration to the vizir of that time; and declared, that if he had a ſon whom he wiſhed to breed a negociator, he would ſend him to the ſchool of the Ottoman court preferable to any other. The Turks excel in all things that require dexterity of hand, and in all bodily exerciſes they take a fancy to. They are the beſt pen men in the world, and this is the reaſon, why they never would permit the art of printing to be introduced among them; and they are alſo the moſt active and dextrous rope-dancers in Europe. Cardanus relates wonders of two of them he ſaw in Italy, one of whom became a Chriſtian, and lived an exemplary life, but always continued his old exerciſe; although his becoming a convert to Chriſtianity, removed the ſuſpicion that the vulgar entertained of his dealing with the devil. The dexterity of the Turks as archers, is ſo eminent, that the force and exactneſs with which they can ſhoot arrows is almoſt incredible. John Barclay, in the fourth

book of his Satyricon, teſtifies to have ſeen a Turk penetrate with an arrow, a plate of ſteel, that was above an inch thick; and that he had ſeen another, who with the ſhaft of an arrow without any iron to it, ſplit the body of a ſmall tree. In the art of confectioning poiſons, they are alſo very expert; for they will make them not only very active, but contrive them ſo, as that they may be adminiſtered without creating ſuſpicion; a thin vapour with which a piece of fine linen is impregnated, if it is afterwards made up in any form, and ſent as a preſent to the perſon to be diſpatched, is made the inſtrument to take away his life. This is a moſt horrid and execrable art; but although it proves the perverſe and wicked diſpoſition of thoſe people, is an argument of their great talents, for acquiring a profound knowledge of all they apply themſelves to underſtand.

XI. The Perſians, are ſtill more poliſhed than the Turks. They have their colleges and univerſities, where they ſtudy arithmetic, geometry, aſtronomy, natural and moral philoſophy, medicine, juriſprudence, rhetoric, and poetry; which laſt, they are paſſionately fond of, and write elegant verſes, although they are generally too redundantly abounding in pompous metaphors; and they are ſo far from being guilty of that

that ferocious neglect of urbanity which we are apt to impute to all the Mahometans, that there are no people who excel them in expreſſions of civility, tenderneſs, and affection. Whenever a Perſian invites any one to his houſe, or is deſirous of manifeſting his eſteem for him, he generally makes uſe of theſe, or ſome ſuch like expreſſions; *I intreat you that you will honour my habitation with your preſence; and I ſhall be ready to devote myſelf to making it agreeable to you in every ſhape, and to indulging all your wiſhes; and ſhould even be willing that the favourite females of my eyes, ſhould be converted to carpets for you to ſet your feet on.*

XII. It is true that in the Eaſt Indies, we do not find the cultivation of letters, but we find there a more than ordinary capacity for attaining them. John Baptiſt Tavernier, ſpeaking of the negroes or mulattoes of that country called Canarines, many of whom are employed in various occupations in Goa, the Philippine iſlands, and other places in the poſſeſſion of the Portugueze and Spaniards, ſays, that the children of thoſe who apply themſelves to ſtudy, acquire more in ſix months, than the children of Europeans learn in a year; and ſays further, that he was told this by ſome of the religious of Goa who had the tutelage of them. I am perſuaded that

the Portugueze, when they firſt ſaw this ſooty-faced race, believed their reaſon, was as obſcure and dark as their complexions; and that they ſuppoſed themſelves nearly as ſuperior in natural talents to them, as men are to brutes; and in how many parts of the globe, where we judge the inhabitants to be ſtupid, might we poſſibly ſee the ſame thing! for the metal of their underſtandings, for want of examining it by the touch-ſtone of ſtudy, has remained occult and unknown.

SECT. IV.

XIII. But the greateſt injuſtice that the vulgar have been guilty of in this particular, is in the conception they have formed of the abilities of the Chineſe. Why do I ſay the vulgar? When you hear men dignified with univerſity honours, whenever they have a mind to heighten an extravagant action, or mode of proceeding that is contrary to all reaſon, ſay at every turn, *this could hardly have happened among the Chineſe*; which amounts to the ſame thing, as making the conduct of the Chineſe, the ſtandard for meaſuring extreme barbariſm. This certainly cannot tally very well with the idea thoſe people entertain of themſelves, which is, that they are the quinteſſence of policy, ingenuity, and penetration;

tion ; for it is a proverb among them, that the Chineſe have two eyes, the Europeans but one, and that all the reſt of the world are totally blind.

XIV. The truth is, that they have great reaſon to believe this ; for they excel in their civil government and policy all other nations. Their precautions for preventing civil, and avoiding foreign wars are admirable; and learned and wiſe men, are not held in ſuch eſtimation by any other people in the world, as by them, and it is to ſuch only, that they confide the reins of government. This alone, is ſufficient to give them credit for being the moſt rational of mankind. The excellence of their inventive faculty is evident, from their being the firſt people, who hit upon the three famous inventions, of printing, gun-powder, and the nautical needle ; for the knowledge of theſe in China, is ſuppoſed to be much anterior to our acquaintance with them in Europe ; and there are alſo ſome well-grounded ſuſpicions, that they were communicated to us from the Chineſe. They excel exceedingly, in whatever arts they apply themſelves to attain; and notwithſtanding our utmoſt exertions, we in Europe, have not been able to equal, nor even to imitate them in many.

XV. There is great reaſon to believe they excel us in their knowledge of medicine, and in their mode of applying it. Their phyſicians, are both phyſicians and apothecaries; and it was formerly the cuſtom in all nations to unite the two profeſſions in one; would to God it was the ſame now! They keep in their houſes all the medicines they make uſe of, which conſiſt of various ſimples, whoſe virtues they have well examined and underſtand; which they collect, prepare, and apply. They are very attentive to, and take a long time in examining the pulſe; and it is very common for them to be near an hour in exploring its movements. But the information they get from this circumſtance, and the appearance of the tongue is ſuch, that by revolving theſe particulars in their mind; they without aſking any queſtions, either of the ſick perſon or thoſe who attend him, pronounce o what ſort the diſtemper is, the ſymptoms that attend it, the time the patient was taken ill, together with all the antecedent and ſubſequent circumſtances, that have accompanied, and will accompany it.

XVI. I am well aware, that this will appear incredible to our phyſicians; but the various accounts we have of China, ſome of which, have been

been written by men of moſt exemplary and unexceptionable characters, all agree in vouching the truth of theſe particulars, ſo that our refuſing to give credit to them, would ſeem raſh and unreaſonable. But if I could poſſibly have entertained any doubt of this matter, our illuſtrious Don Joſeph Manuel de Andaya y Hara, the worthy Prelate of Oviedo, would have removed them, who confirmed theſe relations to me, upon his own experience of a Chineſe phyſician that practiſed in Manila, the capital of the Philippine Iſlands, of whom he told me wonderfnl things, both with reſpect to his prognoſtics and methods of cure. I am perſuaded that ſome of our phyſicians about the court, have got the Book of Andrew Cleyer, the firſt phyſician of Batavia, intituled *Medicina Chinenſium*, which was printed at Augſburgh. The diary of the learned of Paris in the year 1682, makes mention of it; and in that may be ſeen more at large, many of theſe accounts.

XVII. But, ſkilful as the Chineſe phyſicians are in the practice of their art, the Chineſe people are not behind them, in their ſkilful and wiſe regulations for the government of the phyſicians. If the phyſician, after having examined the pulſe and the tongue, does not hit upon the diſtemper and the ſymptoms of it,

which rarely happens, he is diſmiſſed as unſkilful, and another called in. If he does hit upon the foregoing particulars, which is moſt commonly the caſe, they confide the cure to him, and he immediately goes home, and fetches from his houſe a bag of ſimples, which he gives directions for the uſing of, pointing out the manner in which, and the quantity of each that ſhould be applied or taken. When he has compleated the cure, he is paid amply for his time and attendance, and alſo for the medicines he has expended; but if the patient does not recover, the phyſician is not paid, either for the one or the other; ſo that the money of the ſick perſon, is ſaved if he does not get well; and the phyſician, loſes both his time and his medicines if he does not cure him. It is much to be wiſhed, that ſuch a regulation ſubſiſted among us; for although Quevedo ſome time ago complained of the want of it, he did not know it was eſtabliſhed in China. It is true, that he made the complaint in a bantering way, but I believe he felt the want of the regulation very ſenſibly.

XVIII. We may ſay in general of Aſia, that this was the country in which arts and ſciences originated; letters owed their birth to Phenicia; and were from thence tranſported into Egypt and Greece; and the knowledge of aſtronomy came

came from Chaldea, and from thence was circulated into various other countries.

SECT. V.

XIX. As to what regards Africa, we ſhould conſider, that it gave birth to a Cyprianus, and a Tertullian, and what is ſtill more, to an Auguſtin; and that the Africans were at one time, as much ſuperior to the Spaniards in military ſkill, as the Spaniards at this day are to the Africans; and that there was a time, when the conqueſt of all Spain coſt the Africans leſs blood, than it has ſince coſt Spain to conquer a few ſpots in Mauritania. The ſoil and the climate of Africa, are the ſame now they were formerly, and conſequently capable of producing equal geniuſes; and the fault of not cultivating them, ſhould not be imputed to the ſoil or the climate, but to the want of opportunities of inſtruction, or to the neglect of application; but with all this, they are perhaps not ſo uncultivated as is commonly thought. Father Buttier, in his little treatiſe, intituled *An Examination of Vulgar Prejudices*, gives us the copy of a ſpeech, which the ambaſſador from Morocco made to Louis the Fourteenth, which was as eloquent and as much

much to the purpoſe, as if it had been compoſed by a learned European.

SECT. VI.

XX. The conceit, which upon the firſt diſcovery of America was entertained of its inhabitants, and which ſtill ſubſiſts among the generality of people, is, that they are not ſo much directed by reaſon as by inſtinct; as if ſome Circe, in her peregrinations through that vaſt country, had transformed all their men into beaſts. But with all this, there are abundant teſtimonies, that their capacities are in no wiſe inferior to ours. The illuſtrious Palafox, is not contented with allowing them to be equal to us in natural talents, but in the memorial he preſented to the King in their favour, entitled *A Natural Diſplay of the Indies*, declares they excel us. He there gives a relation of an Indian, whoſe perſon he knew, and who went by the name of *The Man of Six Trades*, from his underſtanding, and being able to work well at that number; and of another, who learned to build organs in an amazing ſhort time; and of another, who in an amazing ſhort time alſo, learned to play the organ. He there likewiſe gives an account of the exquiſite addreſs, with which an Indian

Indian recovered a horſe that had been purloined from him by a Spaniard. The Indian, commenced a proſecution againſt the Spaniard for his horſe, and when the trial came on, the beaſt was brought into court, where the Spaniard alledged that he had bought him, and had had him in his poſſeſſion for ſeveral years, which he brought witneſſes to confirm. The Indian, who had no evidence to prove his property in the horſe, finding himſelf hard preſſed, inſtantly threw his cloak over the horſe's head, and requeſted that the Spaniard who inſiſted that he had been owner of the horſe for ſo long a time, might tell of which eye he was blind; the Spaniard, who was taken by ſurpriſe, and much confounded with the queſtion, anſwered at random, the right; upon which the Indian pulled the cloak off the horſe's head, and manifeſted to the whole court, that he was not blind of either eye; this evinced the roguery of the Spaniard, and the Indian recovered his horſe.

XXI. The Europeans under the command of Cortes, had ſcarce penetrated into the kingdom of Mexico, before they experienced many particulars, which convinced them, that the natives of that country were of the ſame ſpecies with themſelves, and the children of the ſame common Father. We read in the Hiſtory of the Conqueſt of

of Mexico, many military ſtratagems of the Indians, that were not inferior to thoſe of the Carthaginians, the Greeks and the Romans; and many people have remarked, that the Crioles or children of Spaniards who are born in America, are more ſprightly, and have more intellectual quickneſs, than thoſe who are born in Spain; but whether what others add, that although their ingenuity manifeſts itſelf ſooner, it does not laſt to ſo late a period of life, be juſt or not, I cannot pretend to determine.

XXII. It would be reaſoning erroneouſly and groſsly, to entertain a mean opinion of the capacities of the Indians, becauſe upon their firſt intercourſe with us, they gave pieces of gold for glaſs beads; for he would be more rude than they, who ſhould conclude they were ſavage, upon this account. If we were to view glaſs free from our prepoſſeſſion in favour of gold, glaſs would appear the moſt beautiful of the two; and with reſpect to what is ſought after, for the purpoſe of ornament and oſtentation, out of two things that are equally beautiful, that which is moſt ſcarce is always preferred. The Americans then in this inſtance, did no more than what is done by all the world. They had plenty of, gold but no glaſs; and it was on this account that they concluded, and not without reaſon,

reaſon, that a ſtring of beads, was a fitter ornament to adorn the neck of a princeſs, than a gold chain. A diamond, if we only regard the neceſſary utility of it, is not of ſuperior value to a glaſs bead; but if we regard its luſtre, it certainly excels it; and although, notwithſtanding the principal difference between the two things, conſiſts only, in the luſtre and beauty of the diamond, the Aſiatics ſell the Europeans a diamond that weighs two ounces, for an amazing number of pounds ſterling; and why is this? It can only be, becauſe ſuch diamonds are exceedingly ſcarce. The inhabitants of the iſland of Formoſa, eſteemed fine braſs preferable to gold, becauſe they had greater plenty of gold than fine braſs, and continued to do ſo, till the Hollanders gave them to underſtand, the great eſtimation in which gold was held in other regions. If there was a greater plenty of gold all over the world, than there was of fine braſs, the laſt of theſe metals would be preferred to the firſt. Upon the arrival of the Dutch Admiral Matelief at the Cape of Good Hope in the year 1605, the African inhabitants of that country, gave him eight and thirty ſheep and two bullocks, for a ſmall quantity of iron, which did not in its value exceed twenty-pence; and the beſt of it was, that they were equally ſatisfied they had impoſed upon the Hollanders, as the Hollanders were that they had

had impoſed upon them. They had a ſuper-abundance of cattle, and were in great want of iron. And in whatever country the ſame ſuper-abundance of cattle, and the ſame want of iron prevails, they muſt purchaſe the iron with the ſame number of cattle.

XXIII. Father Lafitau a Miſſionary Jeſuit, who was a long time among thoſe North American Indians, who, on account of their being eſteemed the moſt barbarous of all, are called ſavages, gives great applauſes of their government and civil policy, and compares them in theſe reſpects, to the antient Lacedemonians: and what is more extraordinary, he alſo beſtows great panegyrics on their eloquence; and goes ſo far as to ſay, that he has known here and there one of them, whoſe orations were equal to thoſe of Cicero and Demoſthenes, and expreſſes ſome doubt, whether they may not be ſaid to excel them. This relation of Father Lafitau, may be ſeen in the Memoirs of Trevoux of 1724, art. 106. It is poſſible, that this account is ſomewhat hyperbolical; but it ſhould be conſidered, that Father Lafitau had a long and an intimate intercourſe with theſe people, and there is no doubt, but a man who ſees things in a near point of view, can judge better of them, than thoſe who ſee them at a diſtance.

XXIV. Our

XXIV. Our intellectual ſight, is expoſed to the ſame defect that our corporeal one is, and is apt to repreſent diſtinct things leſs than they are. There is no man, let his ſtature be as gigantic as it will, who does not appear like a pigmy at a great diſtance. The ſame that happens with reſpect to the ſize of bodies, happens with regard to the ſtature of ſouls. Thoſe nations which are very remote from us, appear ſo ſmall in our eye as rational creatures, that we ſcarce allow them to be endued with the faculty of reaſon; but if we were to view them near, we ſhould probably form a different judgment of them.

SECT. VII.

XXV. It may perhaps be objected to what I have been advancing, that the very abſurd opinions entertained in matters of religion, by the bulk of the people of Aſia, Africa, and America, without inſiſting, upon the total want of any religion among ſome of them, ſhould induce us to form a very mean judgment of their talents.

XXVI. To this I anſwer in the firſt place, that although errors in matters of religion are the worſt of all errors, they are no abſolute

proofs of the rudeneſs of thoſe who aſſent to them. Nobody is ignorant, that the antient Greeks and Romans, who were exceedingly well ſkilled in arts and ſciences, were extremely abſurd with reſpect to the objects of their adoration. They worſhiped as deities, men who had eben adulterers, perfidious, and guilty of all ſorts of wickedneſs. Rome, which as Saint Leon obſerves, domineered over all the other nations, was herſelf under the dominion of the errors of them all. When a man ſets himſelf to ſearch for a divinity from among his own ſpecies, it is a mark of a depraved imagination, and the queſtion reſpecting his capacity, is not worth enquiring into, as we may naturally conclude, he has loſt his reaſon before he makes the attempt. And he who walks blindfold, is not more terrified by a high precipice than a low one, as he is unable to diſcern the difference. I do not even know, whether when a man firſt begins to err in theſe particulars, he does not go the moſt extravagant lengths, who has been the beſt-informed; becauſe in matters of religion, when the firſt error has taken root, it is eaſy for the perſon who is poſſeſſed with it, to confound the myſterious with the ridiculous, and by an affected ſubtilty, pretend to diſcover ſome hidden ſigns of divinity in thoſe things, which in the eye of common ſenſe, are the moſt remote from, or have the leaſt to do with it.

XXVII.

XXVII. I anſwer ſecondly, that we have no certainty, that the idolatry of theſe various nations was ſo groſs as it has been repreſented. With reſpect to the antient idolaters, ſome learned men have enforced this doubt very ſtrongly, and have inſiſted, that there were ſolid reaſons for ſuppoſing, that in the image they did not worſhip the wood, the metal, or the marble of which it was made, but ſome good genius or demon, whom they believed to have reſided in it. Truly it ſeems incredible, that a ſtatuary, ſuch a one as Horace humourouſly deſcribes in one of his Satyrs, ſhould ſtand with his hatchet in one hand, and having the other on the wood he was about to work, ſuſpended and perplexed, whether he ſhould carve the God Priapus, or Eſcanus; I ſay it is incredible, that ſuch a man ſhould ſuppoſe himſelf veſted with ſufficient authority to fabricate a Deity.

XXVIII. I ſay the ſame of the animated idols. How is it credible that the Egyptians, who were for ſome ages the repoſitories of the ſciences, ſhould chuſe for the ultimate object of their adoration, a moſt vile ſnake, and even a dog, or an onion, which Juvenal ironically and with deriſion tells them, was raiſed up to them in their own gardens? *O ſanctas gentes, quibus hæc naſcuntur*

in hortis numina! It is much more reaſonable to ſuppoſe, that that nation, who were much addicted to repreſent every thing enigmatically, and by ſymbols, ſhould adore theſe vile creatures in ſome myſtical ſenſe, which theſe ſerved as a ſort of hierogliphics to explain the ſignification of, and that their adoration of them, was not abſolute but reſpective. The ſame reaſoning might be brought to apply to other nations, both of former and modern times, as well as to them.

XXIX. I am confirmed in this opinion, by what I have read concerning the ſuperſtition which prevails in the iſland of Madagaſcar. The inhabitants of that iſland, worſhip a cricket, and every one rears his own with great care and veneration. Some French ſhips in their voyage to India in the year 1665, touched at Madagaſcar, and being apprized of the ſuperſtition of the natives, a curious Frenchman, aſked one of them whom they reſpected as a wiſe man, what could induce them to worſhip ſo vile an animal, who anſwered, *that they worſhiped the principal and head of all, that is the Creator in the creature, and that it was neceſſary to direct their adoration to a ſenſible object, in order to fix the attention.* Who could have expected to meet with ſo delicate a ſentiment, in ſuch a country? I do not inſiſt,

inſiſt, that the reply exempts them from the note of ſuperſtition, but it proves, that they are not ſtupid and inſenſible. If the ſame obſervation the Frenchman made on the abſurdity of the worſhip of the people of Madagaſcar, had been made to an antient Egyptian, he in all probability, would have returned the ſame anſwer to it in ſubſtance, which the Madagaſcar man gave.

XXX. With regard to people who are ſuppoſed to have no religion at all, I muſt declare, that I doubt whether there are any ſuch people in the world. The voyagers who aſſure us there are ſuch, might poſſibly from their want of ſufficient intercourſe with them, or from the want of underſtanding their language, not be able to penetrate their ſentiments on that head; for all nature proclaims the exiſtence of a Creator with ſo loud a voice, that the moſt ſleepy reaſon cannot fail to be awakened with her cries.

SECT. VIII.

XXXI. There is then, ſcarce any people whatever, if you examine deeply into things, who can with juſtice be deemed barbarous. I will not however deny, that there is not between particular nations, ſome inequality in the

uſe or application of their reaſon. Yes, but this depends in ſome meaſure, on the diſpoſition of their organs, and the climate in which they are born, and theſe poſſibly may have ſome influence to promote this diſpoſition. But if I was to be aſked which are the moſt penetrating and acute nations, I ſhould anſwer ingenuouſly that I could give no judgment in the matter that might ſafely be relied on. I ſee that the ſciences, at one time flouriſhed among the Phenicians, at another among the Chaldeans, at another among the Egyptians, at another among the Greeks, at another among the Romans, and at another among the Arabs, and that at laſt, they extended themſelves to almoſt all the European nations. I obſerve alſo, that the inhabitants of every country into which they were not introduced, were looked upon as rude and uncivilized; but it was generally remarked, that after they came to be introduced into one of theſe laſt, the natives of it did not make leſs advances in them, than thoſe did, who had the happineſs to be the firſt viſited by them. Perhaps if the world laſts much longer, and there ſhould happen great revolutions of empire in it, as Minerva goes wandering about the earth, and continues to ſhift her ſtation according to the violent agitations ſhe receives from the impulſe of Mars; I ſay if ſuch revolutions ſhould happen, the Iroquois, the Laplanders, the Troglodytes, the Garamantes, and other

other people, whom we now look upon with diſdain, and whom we with repugnance admit to be members of our ſpecies, may one day poſſeſs the ſciences in an eminent degree; ſo that experience will hardly aſſiſt us to determine, the inequality of ingenuity, that prevails in different nations.

XXXII. Much leſs then can we determine the point by phyſical reaſonings. Many have endeavoured to eſtabliſh, that this inequality bears proportion, to the predominance of the elemental qualities which prevail in different countries; and it is commonly ſaid, that humid and cloudy climates, produce heavy dull ſpirits, and ſerene and dry ones, ſprightly and penetrating ones. Ariſtotle gives the preference in this matter, to thoſe who inhabit the hot countries. Agreeable to the firſt of theſe opinions, the Venetians and the Hollanders, ſhould be very ſtupid dull people, for the firſt live in marſhes ſurrounded by ſtanding waters, and the laſt in a muddy low country, that might be ſaid to have been ſtolen from the ſea, and which is ſurrounded by ſtanding waters alſo; and agreeable to the ſecond, the negroes of Angola, ſhould be more acute than the Engliſh. It does not appear to me, that any reaſonable man ſhould admit of either of theſe conſequences. But it is not ne-

ceſſary for us to dwell longer on this ſubject at preſent; as we have ſhewn at large in our defence of the women, that we cannot infer there is any inequality of underſtanding, produced by the predominance, the ſenſible qualities have on the temperament; and that therefore, we are under a neceſſity of acknowledging, that the influenee our native country may have over it, is the effect of ſome occult cauſe, which is impenetrable to our reaſon, or at leaſt, which has not been penetrated by it as yet.

XXXIII. When I ſay that by experience, we can hardly diſtinguiſh the inequality of ingenuity of nations, I would be underſtood to mean, in point of the eſſential qualities, of penetration, ſolidity, and clearneſs; and not in point of the accidental ones, of ſuperior quickneſs and readineſs, or thoſe of being more ſlow and tardy of comprehenſion; for with reſpect to theſe, it is evident that ſome nations exceed others. Thus it is manifeſt, that the Italians and French are more quick and ready than the Spaniards; and even in Spain itſelf, there is a great difference between the inhabitants of one province and thoſe of another in theſe reſpects; for it is remarked, that in Aſturias, the people are quicker of apprehenſion, and are more ready at explaining themſelves, than they are in any of the other provinces;

provinces; and the experience of this, ſhould be ſufficient to diſſuade us from falling-in with that general notion, that rainy countries produce heavy dull people; as it is well known, that the heavens may rather be ſaid to inundate, than refreſh this country, ſo that it may be truly called,

Nimborum patriam, loca fœta furentibus auſtris.

XXXIV. But if I was to give my opinion which of the nations of Europe ſhould be preferred to the reſt, with reſpect to their penetration, I ſhould incline to the ſentiment of Heidegger a German author, who concedes this advantage to the Engliſh. It is certain that Great Britain, ſince literature, arts, and ſciences, were firſt cultivated in it, has produced a copious harveſt of authors of the firſt claſs. The recital of thoſe only, which have ariſen in that country, out of the Benedictine and Seraphic orders of religious, would be tedious and tireſome. But I cannot forbear to mention, that we are indebted to each of theſe two orders, for three ſtars of the firſt magnitude. To the Benedictine, for the venerable Bede, the famous Alcuinus, and the celebrated Calculator Suiſet. To the Seraphic, for Alexander de Ales, the ſubtil Scotus, and his diſciple William Ocman.

Cardanus

Cardanus in his Treatiſe (de Subtilit. lib. 16. de Scient.) graduates among the twelve moſt acute geniuſes of the world, the ſubtil Scotus and the Calculator Suiſet, in the fourth and fifth rank, of whom he ſays: *Barbaros ingenio nobis haud eſſe inferiores, quandoquidem ſub Brumæ cælo, diviſa toto orbe Britannia duos tam clari ingeniique viros emiſſerit.*

XXXV. Neither ſhould we conceal, that at the time when the other nations of Europe ſcarce knew what the mathematics meant, the two before-mentioned orders of Religious exhibited two illuſtrious Engliſh mathematicians; Roger Bacon, and Oliver of Malmſbury; of the firſt of whom, the vulgar feigned the ſame tale, they did of Albertus Magnus, that is, that he had made a brazen head, which anſwered all queſtions that were put to it. The other was not leſs famous than he, of whom John Pitſeus relates, that he had invented ſome machinery, by the help of which he was enabled to fly, although he never could attain at doing it, for above the diſtance of about a hundred and twenty yards at a time; but that was doing more, than any other man ever did before him.

XXXVI. On phyſical ſubjects, England has furniſhed a greater number of original authors, than all the other nations of Europe put together;

gether; and the French, who are very tenacious of the reputation of their country for propucing men of ingenuity, are obliged to confeſs, that the Engliſh are ſuperior to them in philoſophical abilities. It may without raſhneſs or exaggeration be ſaid, that all the advances which have been made in phyſical knowledge for a century paſt, are owing to my Lord Chancellor Bacon. It was he that broke through the ſtrait limits, within which, Phyſics till his time had been impriſoned; and he was the man who threw down the columns, on which to mark the boundaries of human knowledge in natural things, *ne plus ultra* had been inſcribed. The moſt learned Peter Gaſſendo, was nothing elſe but a faithful diſciple of Bacon's, and what Bacon had ſaid in a ſummary way, he repeated more at large, in his extenſive philoſophical writings. All that Deſcartes ſaid which was of any real value, he took from Bacon. After Bacon, we may reckon as great originals, Mr. Boyle, and the moſt ſubtil Sir Iſaac Newton; as alſo John Locke *, Sir Kenelm Digby, and many

* This is the ſame John Locke, of whoſe writings, as alſo of thoſe of Rapin, Sidney, and Biſhop Hoadly, the late David Hume, in his Hiſtory of Great Britain, gives the following deſcription: "Compoſitions of the moſt deſpicable "kind both for ſtyle and matter, which have been extolled, "and propagated, and read; as if they had equalled the moſt "celebrated remains of antiquity."

Vid. vol. viii. pag. 323, of the laſt edition of Hume's Hiſtory of Great Britain, publiſhed in 1778.

others;

others; but the misfortune is, that the luſtre of their ingenuity, was tarniſhed with rhe ſame religious blemiſh my Lord Bacon's was; and when they had once ſtrayed out of the right path, they flew with ſuch velocity, that the extent of their wanderings, was great as the livelineſs of their imaginations. But with all this, there has not been wanting in England, ſince it was blemiſhed with hereſy, a Sir Thomas More, who was as celebrated for his Catholic conſtancy, as he was for his eminence in the ſciences.

XXXVII. I muſt alſo ſay, that I have always obſerved in the Engliſh philoſophers, great frankneſs, and that they gave a ſimple plain relation of the reſult of their experience and labours, free from all artifice and deceit; which is a thing not very common with thoſe of other nations; and I have remarked this particularly, in Bacon, Boyle, Sir Iſaac Newton, and Sydenham the phyſician; and it has afforded me great pleaſure, to ſee, how without boaſting they have declared what they know, and without bluſhing, have confeſſed what they are ignorant of. This is the true mark and characteriſtic of ſublime geniuſes. Oh! how much it is to be lamented, that ſuch great lights, ſhould be obſcured by heretical prejudices!

END OF THE FOURTH VOLUME.

ERRATA.

Page 68, line 27, *read* ſuch for example as ſpiritual entities.
Page 101, line 8, *for* that, *read* and that.
Page 104, line 16, *read* and after turning, &c.
Page 129, line 25, *for* executed, *read* executes.
Page 157, line 12, *for* aſcends, *read* aſcend; and line 21, *for* lerned, *read* learned.
Page 158, line 20, *for* but, *read* yet.
Page 169, line 13, *read* many of thoſe inſtruments.
Page 187, line 20, *read* proper reſolution.
Page 212, line 9, *for* had, *read* has.
Page 213, line 14, *for* raiſe, *read* ariſe.
Page 271, line 3, *for* reaſonable, *read* reaſoning.
Page 272, line 6, *for* qulities, *read* qualities.
Page 273, line 10, *for* is, *read* are.
Page 297, line 14, *read* as it is called.
Page 352, line 6, *for* eben, *read* been.

MAR 8 1934